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Economics of information: criteria for counting the cost and benefit

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Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

Information is an economic resource which should be ranked alongside other resources such as capital, labour and materials. The problem is to determine criteria by which we can discuss the economics of information, criteria comparable to those used in discussing the economics of capital creation and exploitation or those of labour utilization and its rewards. The criteria proposed are those used in work study: is it worth doing (value)? is it done efficiently (cost)? are the specifications correct? The most difficult problem is value and proposals are made for possible attacks. Efficiency is somewhat easier since there are some measurable parameters, provided always that the quality and quantity of information is correctly specified. Even when the criteria have been adequately specified, there remains the problem of control—the management element. Suggestions are made for evaluating the effectiveness of management control against criteria themselves highly subjective.

Principles

THE STARTING POINT is that information must be treated as a resource, alongside the classical resources of capital, labour and materials. National and industrial policies are founded on effective exploitation of resources available—Saudi Arabia has oil, Japan has hard-working people, Germany has credit and capital, Britain has knowledge and information. Unfortunately this message is slow to reach the corridors of power and, whereas every company has a finance director and a personnel director and most have a technical or purchasing director concerned with the industry's raw materials, is there any with an information director on the board?

The economics of information should be treated in much the same way as have been treated those of capital creation and utilization and those of labour utilization and its reward: the economics of material exploitation are only too obvious at every petrol station. Contrasting arguments based on this postulate can be found from Arrow¹ and Demsetz² side by side in the *Penguin Reader on Economics of Information and Knowledge*.³

In order to do this treatment, it is necessary to establish some criteria by which to count the cost and benefits. It is perhaps fortunate that, compared with the economics of capital and labour, the economics of information has not so long a history and it is not essential to start with Adam Smith or Karl Marx. For a useful review, see the editor's introduction to the *Penguin Reader* mentioned above. The volume of recent literature is however, substantial although much of it is repetitive—including this

paper. There is a highly relevant comment by Urquhart, 'Perhaps it is time ... to support some research on the economics of economic research in the information transfer field'.⁴

The approach here suggested is, however, not that of an economist, but that of a work-study practitioner. The *first* question to be asked should never be 'how well is the job done?' but 'should the job be done at all?' The first criterion has to be 'is it worth doing?' This is a value judgement and outstandingly the most difficult of the problems to be faced.

The *second* question is 'is it done efficiently?' (granted, that is, that it is worth while).

The *third* question is that of specification. In many ways, it could come first. What is wanted of the information service?

The sequence above is misleading, however, because in fact value, efficiency and specification are not independent variables.

Thus 'value' means the value of obtaining and making available a specified quantity and quality of information, for which there is a determinable cost in relation to the efficiency of the process.

'Efficiency' means the efficiency of handling a demand for specified information of a presumed economic value.

'Specification' means the quality and quantity of information required to produce the desired values at a cost which can be met by efficient working.

Value

As in all economic studies, value is the most contentious figure. This is true for external (social) or internal services, and not only for information. For example, in talking of research, the author has often used the familiar curve (Figure 1), distinguished by having no figures on it. No research costs nothing and yields nothing. Research costing all the company's available cash leaves no benefit. Somewhere in the middle

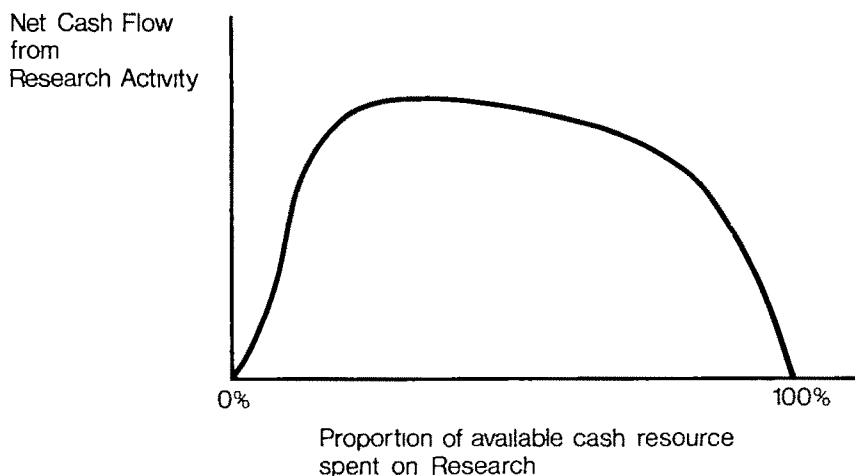


FIG 1. *Costing of research*

is an optimum cost/benefit ratio. The curve is thought to be very flat-topped and thus positioning as near as possible to the left-hand side of the flat top is the test of economic research management judgement, but figures are hard to come by.

The City has provided many occasions to recognize the value of good auditing procedures. But how is the value of an internal audit department priced? An equally familiar example is that of the railway, bus or air service which is uneconomic in accountancy terms but undoubtedly has a high social value.

So it is with information. At the extreme left of the curve, if there were no libraries or information services, there could be no profit from the information not supplied. If the entire resources of the United Kingdom were put into information, who would make the goods or run the social services? Just as for research, the message is 'keep to the left of the flat topped curve.' Above all, we must not be the cynics who know the price of everything and the value of nothing.⁵

The practical lower working limit is that investment you cannot do without if you are to remain the society (nation, company, university, etc.) which you maintain you are. This is the ante required to be included in that particular poker game. The top working limit is what the society (nation, company, etc.) cannot afford more than! Between these limits, we rest on our value judgements.

So far these are generalized, subjective criteria of value. It is however possible to do better and the OSTI Report by Flowerdew and Whitehead,⁶ which makes a careful analysis of the problem, is of particular significance.

Consider first an organization providing information for its own internal corporate use. Such information has a number of value criteria and in the industrial and commercial field these criteria can all be related to industrial and commercial opportunities and threats. Government departments could make a similar categorization in social and political terms. Information, whether self-generated (proprietary) or selected and organized from public sources, is of value in pointing the way to commercial opportunity.⁷ It must for this purpose be accurate (the degree of accuracy may need specifying), complete (similarly) and timely. There is a conflict between authoritativeness (which needs time) and timeliness (which may imperil authoritativeness) and judgement is needed here as to the compromise point. Nevertheless, it should be possible to say retrospectively that if this information had not been available, it would not have been possible for the company to have taken this initiative which led to this profit, or, that if the company had had this information, it could have avoided this loss.⁴

Similarly with threats—information on competitors' activities, impending legislation, specifications and codes of practice, etc. can permit successful anticipatory action or defensive counter-measures of a public relations type.⁸ As Stiglitz said in 1975 'Information has value to the extent that it changes actions'.⁹

The pricing of such values can only be done by comparison with the estimated yield in the absence of the appropriate information. So one criterion is 'where would we have been without it?' Another criterion is that of continuity, or to put it another way, don't price on marginal cost. This is a view contrasting with that of Whitehead.¹⁰ The value of the information service lies not only in its proven past ability to handle a particular threat or provide a particular opportunity, but also in its continued availability for future situations by definition unpredictable in detail but not unforeseeable in principle.

The value of information for external use is equally accessible, or inaccessible. A university or polytechnic cannot operate without a library, but how big? How expensive? The 'benefit evaluation survey' developed by Raffel and Shisko¹¹ (quoted from White¹²) is a methodology for examining alternatives.

A community needs public information sources; how valuable are the citizens' advice bureaux, the public libraries? For companies, is the prestige advertising profitable? The same criteria are applicable. What would the quality of education or of life or the share price be without it? How much is the difference worth? Is the resource adequate to have a chance of meeting future needs?

The public service has the problem, or the good fortune, not to have a direct financial control in the profit and loss account. There is always the, admittedly diminishing, possibility of putting up the rates or printing more money. And the capital is written off anyway. This can actually be a disadvantage since it must inhibit critical value judgements, which need to go alongside the efficiency and specification judgements. This is a permanent problem of the public service and is equally applicable to education, health and many other fields.

Efficiency

Let us suppose that value judgements have indicated that the information service needed to give the desired benefits would be of a certain quality and size, estimated cost £X per annum. The task then becomes that of spending the £X with the maximum efficiency. In English we can distinguish between efficiency (cost per unit) and effectiveness (value per unit) and it should never be forgotten that *occasionally* an inefficient operation may be highly effective and a highly efficient operation so tightly engineered as to be utterly ineffective. There needs to be managerial compromise aimed at the good of the whole enterprise.

We thus seek two types of criteria. First there are those relating to the internal operation of the information procedure. These are relatively straightforward and accessible to expert judgement. For a good account see Kunz *et al*¹³ and also a useful paper by Blick.¹⁴ Public and academic libraries have been well-researched for parameters of efficiency (though these are often claimed as being parameters of effectiveness, which introduces a value judgement). White¹² has made a very useful survey of these techniques, but nevertheless concludes, 'No statistical approach can completely measure the quality of service or the value of information to the user.' It is for this reason that it is desirable to separate as sharply as possible the value element of economic judgement from the mechanistic element.

The second group of criteria relate to the efficiency as seen by the user, i.e. its effectiveness. Often here the time factor is critical. The literature required, be it a publication, patent or statutory order, may be accessed at a low cost satisfying the criterion of internal efficiency, but if it arrives too late for use, the operation is both inefficient and ineffective. User surveys would seem to be the only way of tackling this, but they are inherently biased towards recognition of defects; the user cannot know the value of information of which he is unaware.

The degree of user satisfaction is much easier to ascertain in the case of information for internal use, but external users are by definition less accessible. This is a particular problem of the public service. Thus extremely comprehensive national statistics are

less useful if received so long after the event that only academic historians will find a value. The conflict between efficiency—in this case, completeness, fairness, cover—versus effectiveness—speed—is nowhere so obvious.

An extreme example of user dissatisfaction is that provided by the British Standards Institution. The Aslib/CBI Panel has been hammering away at this one, and it is interesting that the *Guardian* took up the cudgels.¹⁶ A less extreme example is to be found in the service offered by H.M. Stationery Office, also a concern of the Aslib/CBI Panel.

There is yet another example of the conflict between the criteria. Internal efficiency may demand for a survey, a census, etc. a highly computer-compatible statistical form of return which has to be completed by busy uncomputerized people. The result may be hostility and inaccuracy.

Specification

You do not specify that your library contain every book published in the world, indeed, unless you are one of a very select group, you cannot even do this for UK publications. Even the richest of companies is unlikely to need to provide on-line access to every data base in the world or even in Europe. The economics of information depend critically on adequately specifying the nature and comprehensiveness of the service required to provide the presumed values. Ashworth has covered this area superbly in his Aslib Annual Lecture.¹⁸

Earlier a comparison was made with the problems of research management and policy, and the comparison is most appropriate here. The key to economic research management lies in the existence of a corporate policy and *hence* definition of the research programmes needed to further that policy. The key to economic information management similarly lies in policy and programme decisions.

What are the criteria? One hundred per cent of all possible desired information can never be available instantly. In beautifully vague terms, the specification must be that most of the possibly desired information can be available with delays not unreasonable to the user. In individual organizations this will be interpreted in many different ways, but it should always be based on a corporate decision (to which information management is a party).

Consider a department which needs access to chemical literature. There are various non-exclusive possibilities:

- Subscribe to a number of journals (How many? *JCS*, *JACS*, etc.)
- Subscribe to *Chemical Abstracts* (Buy back numbers? A major capital item!)
- Consult *Chemical Abstracts* on-line (UKCIS?)
- Send enquiries to the Science Reference Library, Chemical Society, local university, etc.

How do you specify the hardcover content of your library? Is SDI worth while? Are alerting services necessary? Or do your users already take (and read!) the greater part of the periodicals from which the information would be collected?

There has to be top management decision on the specification of the service both in quantity (coverage) and quality (speed and manner of delivery). Using its value judgements, top management has to put its money where its mouth is. And the

information management then has to carry out the specified task efficiently and effectively. It is important that such decisions be made in principle and not *ad hoc*—particularly taking into account the criterion of continued value mentioned earlier. The specification should thus be compatible with the budget, if not, a mistake has been made in setting the value and efficiency criteria.

This is all somewhat circuitous, but deliberately so in order to emphasize the interrelatedness of these factors in making economic judgements on information. No single criterion or related set stands independently of the others.

Specifications for information for external users are particularly tricky, since there would seem at first glance to be no bounds. 'The public has a right to know,' so it is said. Consider railway timetables. Vital for internal use, their compilation involves the highest arts and sciences available. Once they are made, it is clearly a 'public good' to disseminate them. Do we rely on market forces, i.e. those who wish can buy? No—limited free distributions are made on a local basis. Yet all telephone subscribers have a free local directory and all taxpayers are subscribers to British Rail. So should we not have a free regional timetable? Feeling seems to be moving in this direction, but it is difficult to see the boundaries or how to assess the marginal benefits versus the marginal costs of increasing distribution. Many similar problems arise in social fields such as citizens' advice, consumer advice, even indeed education itself. This area has been well covered by Whitehead,¹⁰ who also provokes the questions 'Cost to whom? Benefit to whom?'

There is no way of escaping the necessity of considered policy decisions as a first step—and reconsideration as a last step. This is a part of the control process

Control

'Criteria for counting the cost and benefit' are useless unless something is done with them. That 'something' is their use as management controls. Control is needed on effectiveness (value), efficiency (cost) and on the specification (adherence, correctness). Pressures on cash and personnel resources put pressures on information management no less than others.

The rising cost of library services is putting a severe strain on educational institutions, particularly those which are expanding or going into new fields. A ball park figure of 5 per cent of the total revenue budget has been given for higher education, but it is difficult to establish whether this relates to the lower limit—what is essential—or the upper limit—there's no more money. Certainly from personal knowledge of one polytechnic, the financial pressures caused by necessary and inevitable change make cold-blooded economic calculations meaningless.

By comparison, industrial research organizations spend between 3 per cent and 4 per cent of their total budgets on their information services: the European Industrial Research Management Association quoted 3.3 per cent as an average¹⁷ and Blick gives 4 per cent for his company.¹⁴ Of course, industrial budgets include depreciation, unlike those of public bodies.

Public library services appear to take around 2 per cent of local authority revenue. Surrey, for example, is quoted¹⁸ as spending over £2 million in 1974/5, this being 2.5 per cent of the education budget, itself 73 per cent of the total revenue.

These are substantial sums, but can be controlled by normal management methods

Control of value and, in particular, of incremental value is however implicit—i.e. by spending more, how much more value was got? The analogy with capital expenditure indicates there might be a further, hidden and irrational, control. Spending money takes management time (to price, to consider, to decide, to act) and this is often the practical control. This lack of critical consideration and action affects information badly, since so often it is at the bottom of the priority list (not altogether surprising with items like cash flow, industrial democracy, etc. at the top). Hence it goes at the bottom of the agenda and is never reached. ✓

While we strive to raise the status of the information function, we must ensure that as managers we deserve the increased status. One way to do this is to use the economic criteria, perhaps subjectively rather than objectively as can be done with financial criteria such as cash flow and return on investment, and then be prepared to be judged against a further set of criteria. ←

A structure for this exercise would be as follows.

A Criteria for value

Is the resource adequate for forecast future needs? Has it the necessary continuity?
 Was an opportunity lost or a threat inadequately handled for lack of information?
 What did this cost the organization?
 Was an opportunity commercialized or a threat repulsed as a (partial) result of good information? What was this worth to the organization?
 Was information of unique social value disseminated outside the organization? Did it significantly improve the quality of life? Were there other ways of effecting the same improvement? Would their cost give an indication of value?

B Criteria for efficiency

How does the cost of the service compare with any other options?
 How do time lags compare with other means? With past performance?
 Do your users seek other options? At what cost?

C Criteria for specification

Can you assess the required balance between authoritativeness and speed of response?
 Do you know the frequency of use of your sources/stock? Is there any overkill?

D Criteria for management control

Is there a corporate policy on information?
 Does the service meet the general requirements of this policy?
 Are individual users satisfied?
 Did the actual cost conform to estimates?
 Applying the criteria in A, B and C, does the cost benefit balance seem reasonable?
 Which way is it moving?
 All the usual management criteria of staff development, etc.

To practically all of these questions can be added the words 'if not, why not?' It will be realized that very few of these criteria are objective and there is a danger of

concentrating on those that are, such as cost per hit, etc. It is worth making ball park estimates of values but these are so full of uncertainties that answers closer than an order of magnitude are misleading. The real economic test lies in the answers to two more questions:

Could the organization do without the service it has (and achieve its policy objectives)?

Would the organization pay for a bigger/better service?

Finally, one should re-emphasize the cyclic nature of the process for use of judgement criteria. This is very familiar in all policy considerations¹⁹ and can be shown schematically as a coda:

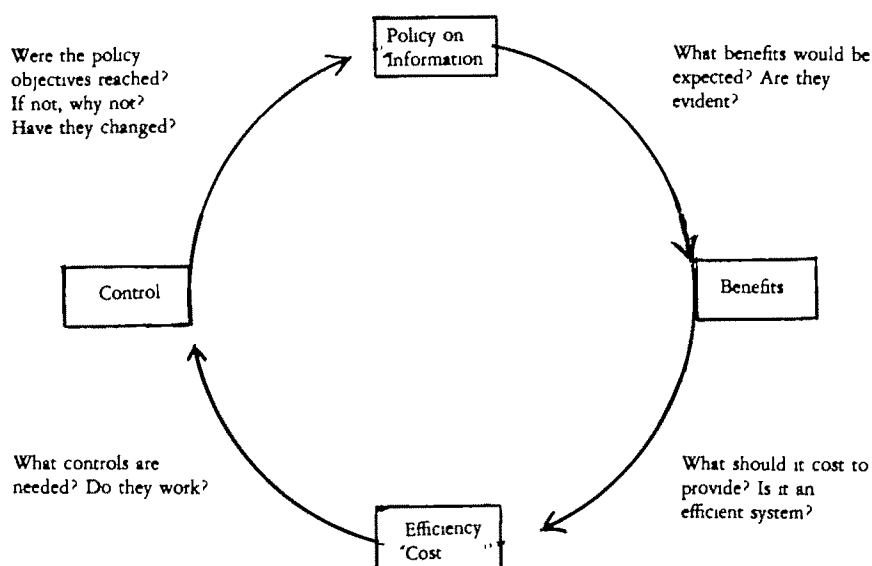


FIG 2. Process for the use of judgement criteria

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Information in industry—management's indispensable resource

Sir Alastair Pilkington

Pilkington Bros Ltd; President of Aslib

Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

AT THE END of my talk today I hope I will have left one particular idea with you—that an information service will only be good if the professionals who work in it come out among their customers and make it so. They will make it good through creating partnership with their customers in order to help identify, understand and meet their needs. They will not make it good by expecting customers to come to them for information. Customers are more likely to forget they have an information service if that service is not active. Then they will waste time and money going elsewhere for information.

Success in a company is better decisions resulting in a better company. Professional skills and techniques in information work do not represent success in themselves. They must be a means to the end of better decisions, and the only way for information providers to contribute to better decisions is by coming off the touchline and joining the team that has to make them.

In making my remarks today I am not talking about being 'a well-informed man'. I am talking as one who cares about the right information being provided to help make decisions. I am not interested in a static information service as I do not believe that will provide the right information. The right information justifies the claim made by the title of this talk that information is management's indispensable resource. Information which does not meet my needs—or which is invisible because of passivity—is an easily dispensable resource.

Partnership between user and supplier

I am quite clear that there is a need for information professionals. No one can have any doubts that there is a rising tide of information. As a user I need help. I seem increasingly to have to skim some things it would be pleasurable to read in more detail, the simple things like the daily press, the management journals, the technical journals and, indeed, the journals about information.

The statistics are daunting. book production doubling in the last twenty years; government publications alone doubling in the last fifteen; and the sum total of human knowledge estimated to be doubling every five years.

How do we cope?

Part of the answer, of course, is to define very tightly one's real needs, and sheer

volume is a powerful influence in making us do that. Part of the answer is to determine what may be digested for you. Part is to determine how much really should be delegated elsewhere, and that applies at all management levels. Part is to use new technology well. Part, too, is to be circumspect about the opportunity afforded by new technology to be given even more information than in the past, there is a danger that ease of access may lead us into areas of information which are really outside our span of responsibility.

Part of the answer also, and, as I have indicated, the most important part, is for the users of information not to try and do all these things by themselves but to do them in partnership with all those who will be involved in providing it.

That does not simply mean those who are the information professionals in an organization but rather those in each part of an organization responsible for providing information, in partnership with the professionals.

The information professionals have, of course, a special role in helping others in a company marshal what they have available and in marrying that to other information gleaned from outside the company, and indeed from other parts of the same company. They have a special role in the organization of information and in the techniques of gathering, distributing and storing it.

But these professionals need to be integrated with others in the organization who have information and can acquire more, and with the users who themselves will have information and who ultimately will take the action.

Information people should not be people apart. It is quite artificial to split up information provided, say, from external published sources, from that provided as a result of the visit by a marketing man to a competitor. If we need information on competitors, we need all available information brought together, analysed and coherently expressed. If the various types of information are not to be kept apart, neither should those responsible for their provision, collation and analysis. We in industry have to work hard to integrate information providers with users so that they not only provide information but also help with all the stages of defining needs, determining how to meet them and meeting them. That comes down to good organization, to which I'll return later.

I believe that as society generates more and more information and as technology for collecting, disseminating and retrieving it develops with increasing rapidity, it is imperative that the closest partnership is struck between those in industry who provide information and those who use it.

R & D experience

This simple idea of partnership is one that I borrow from experience elsewhere inside my company, particularly in the relationship between R & D and other parts of the business. Unless there is partnership between R & D, production, engineering and marketing, we will not develop the best improvements to today's products and processes, nor will we invent and develop the winners for tomorrow. We have concluded that nothing short of total integration between customers and suppliers would represent success.

We had to encourage technical people to understand each other's role and value. We needed the researcher, trying to increase understanding, and the production

engineer, trying to turn this greater understanding into more successful operations, to be at one—with the latter not being denigrated because of a role which might appear less demanding intellectually or less glamorous. We needed to create an organization which would help encourage a free flow of ideas and people between the factories and laboratories.

There are, of course, obstacles to be overcome in order to create the necessary partnership. Some result from the disciplines brought into R & D. Research people are usually recruited for their scientific knowledge in a particular discipline. They are mostly physicists, chemists and so on who hold on to their disciplines; they come from a world about which they know a lot—but they often have little knowledge outside it.

Resistance to researchers from the production side of the fence is another obstacle. In manufacturing industry, there is often a feeling in production departments that they carry the greater burden on their shoulders. They have to supply the customers, pay the wages, remain competitive. They often feel that research is an added charge for them to carry and that they are probably not getting good value for money. It is an interesting aside that people tend to believe that things about which they know little or nothing are being done badly, particularly if they are paying for them.

I have probably said enough to suggest to you that there may be similar, if not the same, obstacles to be overcome in creating the most effective partnerships between information workers and all those who will add to and use the information and the techniques for organizing it which they can provide.

We found that by defining the desirable characteristics of the relationship between R & D and the rest of the business, a successful partnership could be created. There are many possibilities. For example, the creation and maintenance of intellectual parity between those in R & D and those in production; and the creation of working parties in which people from different disciplines sit down and work out together what they need to do.

Parallels again may occur to you for relationships between providers and users of information in industry.

Partnership improves service

Who will take the initiatives to create the partnerships in industry that will lead to the most efficient and effective application of information?

I believe the starting place is with the information workers themselves. Just as the marketing team must identify the requirements of customers, and explain how closely they can meet them, so, too, the information workers must identify what their users want and how their needs may be met. It is from systematic and regular exercises to do this that the value of information is understood and partnerships are struck. It is no good complaining that an organization is not information-minded and then doing nothing to put that right!

What sort of information do we in industry want?

I believe success is to have the relevant knowledge available, received and applied. This is special to industry: we need information that is not simply interesting but information that will help us make better decisions and take better actions. 'Will this help me do my job better?' is the question we must ask when we are provided with

information. And it is that sort of question the information worker needs to ask when assessing users' needs.

It is not a simple matter, however. There are some types of information whose value can be more easily measured than others'.

Successfully applied technical information can be measured in terms of its effect on plant operations, for example

The more general information, however, presents greater difficulties in evaluation. How can background information on, say, the financial health of a country, which helps you arrive at decisions on a whole range of things, be evaluated?

Our partnership should allow these questions to be explored between provider and user. Not that any hard and fast rules will emerge but it is only through exchange of needs and means of meeting them that an acceptable and constantly improving service will result

The more general the information, the more difficult it is to avoid 'noise'. How much real signal is there, for example, in politicians' election addresses? Part of the skill of information workers is to select the real signals and to eliminate as much noise as possible. That is a powerful means of overcoming resistance to information and, again, should be helped by successful partnership.

There is the need to know that customers are satisfied; that they are not being inundated with information off the mark; and that they are not being surprised, or caught out, because important information is not coming their way. Information providers need evidence of information being received, and acted on. It is important to know that the important has been acted upon. Equally, however, you should not be discouraged if good communications are sometimes dropped in the bin

The fact that good communications are not picked up by everyone they are aimed at is no excuse for bad communications. Again, providers and users working together should help monitor effectiveness of information provided. It will also be as a result of attempting to monitor effectiveness that a more spontaneous feedback from users is likely to develop

Understanding new technology

There is every need for a strong relationship between providers and users as more technology becomes available to us. The role of the providers will be not only to ensure that they themselves use the most appropriate technology to acquire, disseminate, store and retrieve information, but also to help educate users about the technology that they may use themselves—without the need for an information worker between them and the source.

I think most of us are clear that there is going to be change. We are hearing a mounting chorus: Prestel, internal viewdata, word processors, computer data bases, office of the future, new technology, information society. We are going through the awareness stage—although many, I suspect, are not yet fully aware of the functions that can be undertaken *now* with existing technology. ('Now', incidentally, is an important word. Unless you're good now, you'll never be good, because it's always now.)

We users must be helped to understand how the technology will help us to do our jobs better, we realize that change is coming and we need to be educated in how to



make the best use of it. Part of that responsibility must fall upon the information professional.

It is clear enough from other examples of technological change—particularly in new manufacturing processes—that success is likely to result from good communications and understanding about the need for change. These are times when change is normality. Fear and misgivings are natural but they can be reduced when people understand the reasons for change and the effect it may have on them and when they are convinced change is being managed well and sympathetically.

In a manufacturing environment, people need to understand what is making their products and processes uncompetitive if they are to be convinced a new process is necessary. In an information context people similarly need to understand how electronic processing has the edge over previous processes in terms of supplying their information needs

In manufacturing, people need to understand what differences new processes will make to the way they have to work; so, too, in information processing as new forms are proposed.

Looking outwards, towards the producers of new forms of electronic processing, it must fall on information workers to help ensure that these are appropriate to their organizations' needs. It is their role to identify, for example, the information gaps which the providers of data bases should fill, the requirements they can best meet with their substitutes for printed matter, and the special requirements of their organizations for disseminating and retrieving information.

The new technology will also put different emphasis on the role of information professionals, as they are increasingly called on to understand, influence and help usher in new technology.

It is possible to envisage much more information being stored on internal data bases, fed both directly from external data bases and from in-house information. Many people in an organization will potentially have access to this store and, as a result, the strengths of the information managers may increasingly be available for better research into sources and their acquisition, for greater involvement in analysis of information in partnership with users, and for more comprehensive monitoring of changing needs

The new technology should also have a uniting effect on parts of organizations. While the various information providers in a company can now develop independent systems, a common data base should stimulate joint consideration of how best to structure information for a company as a whole

Good organization, good information

That makes it all the more important for information providers to be defining how they relate to each other in an organization. Part of their responsibility, if their service to management is to be clear, recognized and wanted, is to be clear themselves on what are their fields of responsibility and on how these differ from—or legitimately resemble—each other's.

What are the differences between those providing information from the centre of a company and those providing it in component parts? How should they dovetail? What are the differences between those in the technical areas who are providing

information and those in the commercial areas? How do they complement each other? How do they support each other?

A result should be some sort of network, formal or informal, with the role of the various components of an information service clear both to members of it and to the users in the organization.

I referred earlier to good organization. I define good organization as organization which makes it easy to do the right thing. Good organization—in this case well-integrated—will make it easy for information people to understand each other's role in a company. If they understand each other's role then they should provide information in the most economical way for their users and will be in a strong position to define in the best way the most appropriate technology to adopt in the future.

Good organization will make it easy to understand the needs of users. If these are understood then information that can be successfully applied should result. There are many devices that can be used—the regular formal review, the emphasis on face-to-face contact—and important among these is the encouragement of interchange of people between user and supplier.

An organization which occasionally turns a user into a supplier collects a cost benefit. Much energy is needed to help suppliers understand the needs of users—and of course this costs time and money (well spent, I hasten to add) But this process can be much accelerated if part of one's organization is made up of people who already have what we may term 'market knowledge' because they have already worked in the market.

I realize that I am only now beginning to talk specifically about economics of information provision. But I believe all the aspects of the job which I have touched on contribute to economical supply.

A user's needs and expectations

I think I should also talk some more about the needs I have, and see, as a user, over and above those which have come out somewhat incidentally so far. All the points I make will, I believe, strengthen relationships between supplier and user and thereby add to the efficiency of supply.

The digested form is most important. I think most companies will be prepared to spend some money to ensure the right information reaches their senior people in a form that does not add to their burdens. As an aside, information people sometimes need to resist overkill. Sometimes the acquisition of an interesting piece of information generates an enthusiasm to share it as widely as possible—a feeling not always reciprocated by the customer!

It is increasingly important for users to feel confident that there is knowledge in a company of *how* to get answers—and by no means necessarily by having rooms full of dust-gathering data. There will, of course, be special areas of information that a company will have to keep but I believe these need to be carefully defined in relation to what is available quickly enough from outside sources. This relationship is presumably likely to change as new technology challenges hard copy as a medium for acquiring external information. Whatever the methods of acquisition, users will need help to penetrate the increasing volume and to eliminate the useless.

Companies will expect their information people to take maximum advantage of

information already available inside the companies. It is sometimes forgotten that everyone is a source of knowledge and very often the answer to a question put by one part of the company is in someone's head—or file—elsewhere in the same company. It is also most important that there is co-ordination of internal reports, especially in the technical area, to help share information and to ensure work is not repeated unnecessarily.

Knowing who has got information inside a company will come through an information service being active. An active service which frequently talks to its customers, tests information on them when it is unsure, deliberately exposes itself to reviews of its value and constantly tries to understand the way products and processes are developing will be an accurate service and thus one that avoids waste and with it, customer rejection.

An active service will mould itself to the differing needs for information in different parts of an organization. Part of this moulding will come, for example, from identifying what may best be done centrally in an organization because it meets the needs of many parts, and from identifying what may best be done in a particular part because it is of peculiar interest there. Part of the moulding will also come from understanding the extent of the informal flow of information in an organization. There is a massive informal flow. All of us in companies are information providers and users. We all read magazines, all send information to each other, all store it in some form or other. This informal system of getting information around an organization is vital. But information is not our first priority job in the way that it is of a formal information service. The information service must strive to understand the informal systems and then to identify how it should tailor its service to support them.

Companies that want the best out of their information services will use them as much more than readers, providers and people who can answer questions when you are stuck. Deeper understanding of customers' needs through the partnership I have advocated, and through an active approach to the job, should enable deeper involvement in the planning process in organizations—whether it be for a new process, an acquisition or a new product. Information people should involve themselves to the point of demonstrating their interest in their customers' success. They should be interested in customers being competitive because the information they have supplied is concerned with helping them be so. They should feel entitled to ask their customers whether they are competitive and to help find measures for demonstrating whether they are.

The need for an information service to be oriented to the future has a bearing on where it should be structured within a company. Information is required to help us understand the present and define the future. You can alter the future but not the past and there is always a danger that information is seen as related to the past rather than as an important influence on the definition of the future. Information must be geared to helping us identify threat and opportunity. If the market for cars goes in a particular direction, what will the effect be on our sales? If customer A merges with customer B does that weaken or strengthen our position? Where are our competitors investing? What new products are they making? In which directions are they moving with their R & D programmes? What new technical developments are suppliers or potential suppliers engaged in?

Information departments are thus best tied to departments concerned with defining

the future. If they are to be successful, locations are likely to be in departments concerned with the future—thus the planning departments, whether in R & D, in corporate headquarters or in the operating divisions, are a logical choice. This closeness to the main users—by being in structural terms a part of them—will help develop efficient and effective service.

Essential to success

A good information service should offer a guarantee to management that the information it needs from external sources will be adequately monitored and directed to the right place; a guarantee that the organization will be equipped to digest and store what is really needed; that new information technology will be understood, influenced and adopted as appropriate; that the most effective partnerships will be struck between users and providers so that the most efficient and economical supply of information results.

As I said at the beginning, the information service in industry needs to show its customers what it can do, be active, come in from the touchline and join the team.

Most companies are prepared to pay for such a service, because such a service is an essential part of a successful company.

Developing an information network for an industrial marketing organization

J. R. Edwards

Edgar Vaughan & Co Ltd

Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

THIS PAPER WILL review the requirements in terms of information systems that are put onto a company when it changes from a traditional field sales day-to-day management orientation to a marketing orientation aligned with a new environment of planning and delegated decision-making. This will be looked at from the viewpoint of marketing management in particular, rather than from the information officer's position.

The company in 1970

The company in question is a medium-sized organization which, in 1970, had sales of approximately £2 million per annum, and 250 employees. The company manufactures and sells a range of industrial oils and chemicals, which in general are service orientated, requiring technical expertise to sell and maintain. The company is associated with an international group, all with similar product lines

In 1970, the orientation of the company was essentially that of field sales. The field sales force were, and indeed still are, the prime movers of the organization, having considerable freedom to sell a range of products from a sales book listing a large product line. Such was the flexibility of the company that, if a standard product did not exist for a particular application which the representative unearthed, the company would regularly produce such a product. Thus, the company's growth was in general unplanned and arose from the day-to-day production of opportunities by the field sales force.

In terms of the information requirements which this structure placed on the organization, these would typically be of a relatively straightforward nature, e.g. 'one-offs' such as:

- formulations and raw material information,
- competitive product specifications;
- equipment specifications;
- customer commercial data.

In general very little consideration was given to the outside environment, the company usually developing its own programmes of product development, etc., from the individual opportunities uncovered. It must be emphasized that this was in no way

an untypical approach for a small- to medium-sized company in the 1960s and early 1970s environment and is indeed still very common today.

The early 1970s environment

We shall now take a brief look at the environment in the early 1970s in which this company was operating. In the 1950s and 60s, economic growth occurred, even in the UK, in fairly well-defined business cycles. Markets were generally stable, and consequently forecasting and planning were less critical to the small organization than they are in today's more volatile environment.

In the early 1970s radical changes took place in this environment caused by a combination of factors, of which the Middle East oil crisis was only one.

- Markets became increasingly complex because of the interacting factors of government intervention, pressure groups, etc.
- Inflation grew to levels previously inconceivable in a Western economy. Nowhere, obviously, was this more felt than by companies involved with oils and petrochemicals.
- Technological change accelerated during the 1970s, involving manufacturing equipment used by industry, and indeed virtually every aspect of company operations.
- Legislation—on health and safety at work and on environmental aspects—was passed which had a significant impact on the chemical industry, particularly relating to its requirements for information provision, etc.
- Internationalization accelerated, meaning that the UK markets could no longer exist as insular units, protected from changes elsewhere.

These dramatic changes, along with other factors, produced a situation by the mid-70s that virtually ended economic growth, or at least that part of it generated by manufacturing industry, and also brought an end to the traditional business cycle as we had previously known it. In the wake of these changes, traditional economists were left floundering, in general unable to make analytical projections of expectations with accuracy based on historical experience. Such specializations as econometrics expanded and in particular an explosion took place in the demand for information, in order to better monitor the new environment.

Changes in the company

Now let us return to our company and examine what was happening to it during this very dramatic period of change. During the 1970s the company had grown from its sales figure of £2 million to its current sales figure of around £10 million. However, a large part of this growth was through inflation, which brought with it major new requirements in the management of finance. The company's product line had become much more complex, with increasing emphasis being put onto synthetic or chemical alternatives to traditional mineral oil products.

The company decided in the early 1970s that it needed to modify its traditional field sales orientation with its requirement for considerable flexibility to react on a day to day basis, to a marketing orientation. Whilst this orientation still recognizes field

sales as the critical function is producing business in an industrial marketing environment, it does introduce a new dimension into the overall way in which the company views its business. Marketing orientation in this situation can be considered as monitoring the environment for opportunities, and then organizing the resources of the company to profitably exploit suitable opportunities which arise. Hence the emphasis is one of monitoring, planning, organizing—a very different way of life for the management involved.

In terms of the organization itself, such changes as formalizing the sales management structure and the technical management structure were made in order to better provide for planning and control. In addition, a new function of product management was introduced, which in effect split the company's business into five departments, each managed by an individual who was expected to run his department as a commercial operation, cutting across all functions within the company. A formalized marketing services function is also in the process of being set up, with the intention of providing such services as promotional material, information services, market research, etc. to the three main functional areas within the marketing division.

All of these changes were made with the intention of delegating management decision-making to a level never previously involved in such decisions, in a far more complex environment.

Information requirements of the new organization

The sort of information requirements which the new organization has are very different from those of the past, e.g.:

Internal analyses to monitor the company's performance A computer within a new data processing department was introduced to replace the company's previous use of outside bureaux. A committee was set up to streamline the introduction of the new systems, and considerable planning effort went into ensuring that the system was geared to providing management information, rather than acting as purely a high powered accounting machine.

Such analyses as sales by customer, product, etc. are produced routinely or on demand, and splits of this information by industry type, customer group, etc. are available.

Flexible interrogation suites are being developed which will access a data base of information in any number of different forms.

Suites for formulation and costing have also been introduced into the system in addition to the more traditional commercial programmes, meaning that very detailed analyses of profit contribution can be made, a godsend in the very volatile cost market of the last few years.

The greatest danger is that of 'swamping' managers with information when a computer is introduced, and we have been guilty of that to a certain extent. However, as interrogation suites are further developed we will be able to emphasize much more in the way of exception reports and on-demand analyses. In the writer's opinion, a critical requirement is to keep the computer out of a company's accounts department, preferably in an individual department acting as a service to all company functions. As soon as a computer is absorbed into an accounts department, it will inevitably be used primarily as an accounting machine, and only secondarily as an information tool.

External data to monitor the outside environment A considerable increase in the requirement for a range of external data has taken place, and this requirement will increase even more as management's total awareness of its new responsibilities develops. This information takes the form of:

- government data;
- customers' market data;
- competitive information;
- health and safety information;
- new raw materials;
- equipment details;
- general economic information.

As far as the availability of this information is concerned, the greatest shortage is of information relating to small market units. Any information that is available, e.g. government data, is certainly not geared to the industrial marketer, and consequently needs a considerable amount of interpretation before being suitable for management consumption.

Routine information, such as general customer commercial data

Market and desk research. Market research is often considered a luxury, relevant principally to consumer marketing organizations. However, if only in a fundamental form of desk research, the modern industrial marketing organization should have a considerable requirement for market data, and often the only way of obtaining this is through some form, however simple, of market research. This should not be considered as an individual information requirement, but more as just one possible method of providing information to management.

To put these information requirements into slightly different perspectives, we will now look at the responsibilities of the three main marketing functions in the re-organized company, and the requirements for information that these responsibilities now place upon the individuals involved.

Field sales management

Responsibility to direct the field sales operation towards exploiting the most profitable opportunities in line with the company's long term plans.

Typical information requirements implied by this

- geographical market data by industry, customer, etc ;
- product sales/profitability within the sales areas;
- new product data and performance reports;
- customer sales figures,
- expenses and budget information;
- competitive information;
- monitoring information relating to field sales performance, e.g. call rates, follow-up data, etc.;
- general customer information—orders, invoices, prices, etc.

Technical management

Responsibility: all aspects of product formulation—research and development, quality control, laboratory technical service, raw material investigation, etc.

Typical information requirements implied by this responsibility.

new raw material data;
health and safety information;
competitive product analyses,
performance reports and sales analyses by product and product type.

Product management

Responsibility: to manage their product groups as business entities, cutting across all departments to maximize profitability. Also to develop long term plans and short term plans for their departments, and to co-ordinate other company departments as necessary to ensure that these plans are followed

Typical information requirements implied by this responsibility:

abridged versions of much of the information described above for field sales and technical;
general economic information to aid with long term plans, forecasts, etc.;
equipment information relevant to their product departments,
product costing and profitability analyses,
product performance information in detailed form—e.g. the ability to recall certain historical product/application combinations through a comprehensive indexing system

Suddenly we have totally new requirements, and a totally new resource to manage—information—if management is to effectively do its job. This requirement exists even if management does not at first realize it.

Programme of information network organization

Having gained some idea of the users' new information requirements, obviously we have to organize the resource that will provide this information. The first, and most critical in many ways, stage was the development of the computer resource. This is an ongoing development programme, although the basic system has been up and running successfully for some two years or more.

Apart from the data processing requirements, the development of our new information network is proceeding along the following lines, based upon the nucleus of what previously had been our technical information department, handling the more straightforward requirements of the old organization:

- 1 A survey of our existing technical information department, which to date has been part of our overall technical department, was carried out involving Aslib staff. Recommendations were made regarding the organization of the information and likely future requirements.
- 2 A recruitment programme was initiated to find a person to run the new information department, and difficulty was encountered with finding the sort that the writer considered was required for this position. The problem was that the ideal person needed a technical background, together with some background in marketing services, as well as needing information management experience.

In addition, some experience in working with market research would also have been of considerable use. There was certainly nobody with such a background on Aslib's Register, and in the end, through advertising, we recruited a technical/marketing service man from the machine tool industry, who is developing his own knowledge of information management in conjunction with Aslib. In addition, we have maintained part of the time of our general technical service personnel in order to make a contribution to the information department, particularly as it relates to the holding of technical data. A marketing assistant to carry out routine analyses and an information clerk are provided as staff for the department manager

- 3 As regards department organization, the weeding of old files, together with centralizing the old customer filing department, containing much of the routine data of a commercial nature, is currently taking place, together with the addition of a large amount of new information of a more general marketing nature.
- 4 The information department is being developed as marketing's main link with data processing—a filter between the computer department and the marketing staff who require its analyses.
- 5 Improvement/increase of journal scanning and abstracts, not just of a technical nature, is taking place. Commercial journal scanning is being added to the previous technical scanning with such journals as the *Financial Times* being abstracted as necessary.
- 6 Marketing/commercial/economic summaries are being developed in a periodic form of newsletter. It is essential that management is not just left with reviews of this nature to study in their raw form. Interpretation and extracting ensure that the hard-pressed manager is more likely to give time to these important items.
- 7 Greater use of libraries/external abstracting services is being investigated, possibly at the expense of holding certain items ourselves.
- 8 Market research/desk research is being incorporated into this department's responsibilities.
- 9 An efficient indexing/recall system is being developed for field sales reports. This will allow a number of parameters of product/application, etc. to be recalled from our file of field sales experiences. A micro-computer to assist in this indexing is currently under consideration.
- 10 Other aspects of marketing services are gradually being incorporated into this department's responsibilities to make it into a true filter department for the information required by the marketing division, e.g. territory/salesman head office administration, performance monitoring, etc.
- 11 Improvement in the facilities of this department have taken place, with the provision of a new office housing a modern Lektrier electrical filing system, shared usage of a microfilm facility in conjunction with the accounts department, and, as mentioned above, consideration of a micro-computer for indexing purposes.

The eventual aim of this programme is to develop a *complete* marketing services set-up, of which information dissemination is *the* critical function. It must not be just an information department, although information provision will be the main motor

Dissemination

Finally, we will look briefly at the aspects of dissemination of information within the re-organized company. It is important to remember that new responsibilities take a considerable time for a person to assimilate, and very often the manager working in a new environment of delegated decision-making will not fully comprehend what information he is going to need to do his job properly, until he has been in that job for some time. The ingenuity of individuals in developing their own information systems is boundless. Resistance to taking this responsibility away from them, and giving it back to them in a more comprehensive format, perhaps with additional information thrown in, is often apparent at first. The text book says that the information officer should 'discuss with all information users their requirements'. Whilst this has much merit, there is no doubt that in many cases the information officer, in conjunction with the divisional director with responsibility over the managers involved, will be able to put to these managers the sort of information that could be useful to them and could be provided. Then a more comprehensive picture of requirements can be developed.

So first, the user's confidence must be gained. There will undoubtedly be some duplication of information systems between individuals and the information department, until this confidence is fully gained. The next step is working with the users to find out what information they really do need to do their job more effectively.

Typically, information requirements will fall into the following categories:

Senior management

This level of management will require a hierarchy of external data, abstracts, etc in order to give them the overall picture of the environment essential for their more free-ranging responsibilities. In addition, they will require internal data presented in a comprehensive, exception-orientated format, with further detail available on demand if required.

Middle and junior management

This level require much more detailed internal data, particularly relating specifically to their job function. In addition, a selective provision of some external data is desirable.

On-demand information for all levels

It is essential that a rapid turnaround for one-off questions, of both an external and an internal source nature, is provided. There is nothing more frustrating, and more likely to damage the user's confidence in the information department, than to hear it said that a particular piece of information could have been obtained far more quickly if the user had done it himself, rather than following the formalized lines of going through the information department. I am not saying that this will never happen—problems of an exceptional nature will always arise, and all organizations have individuals within their ranks who are never satisfied by the services provided from other departments. However, the information officer is in the business of gaining general confidence throughout the organization, and it is critical to take every opportunity to do this. Gaining this confidence will take time and practice.

Conclusion

In total we have looked at a typical field sales orientated small-/medium-sized company as it existed in the early 1970s. We have reviewed the environmental changes which took place around that company during the 70s, and the company's decision to introduce a marketing orientation to its operations. We have looked at the impact which this orientation had on the company's management, and the decisions required of them, and in particular we have developed their information requirements. Finally, we have looked briefly at the organization and dissemination of this information.

My intention has been to emphasize to you that the company in question is in no way unique. In the modern business environment, the marketing philosophy of monitoring the environment and acting accordingly is alive and well, and crying out for the information on which to feed. Any suggestions from some pundits that marketing is dead because we have lost growth is nonsense. At a time of limited growth the requirement to scientifically review opportunities and exploit them is greater than ever.

Within industry there is a great requirement for marketing-orientated information managers. We do not want information officers who build ivory towers—we have had too many data processing managers like that. We require information managers who appreciate the overall requirements of organizations of this nature, and can develop service functions to assist with meeting objectives. There does appear to be a considerable shortage of this type of person, and that is the message with which I should like to leave you.

Putting a price on information: practice illustrating a basic principle

Mary Griffin

Smiths Industries Ltd

Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

THIS PAPER DRAWS nothing from and certainly contributes nothing to the wealth of literature on the value of information and the methods for estimating that value. The theory of the economics of information is being presented, explored and appraised by other speakers at this conference but nothing in this paper relates directly to that topic, nor has any attempt been made to characterize the practices about to be described so that they can be positioned in a theoretical framework.

What follows is, however, not wholly irrelevant to the theme of this conference because the basis of those practices is that, as Professor Wilkinson has postulated quite clearly,¹ information is an economic resource which must be ranked alongside other resources such as capital, labour and materials.

This presentation, therefore, concentrates wholly on the day-to-day operations of Smiths Industries' Corporate Market Research and Information Services Department with the prime objective of describing how that department is controlled as a separate cost centre within SI.

No claim is made that the optimum method for meeting the company's real information needs has been isolated and adopted but it is crucial to appreciate at the outset that the only purpose of the department is to anticipate and meet those information needs and that, therefore, the accounting-cum-bookkeeping routines which will be described in fair detail here are very much peripheral tasks. They are, therefore, kept as simple as possible so that no significant resources are diverted from the real job of the department—that of providing timely information

SI: its size and structure

The way the department functions will perhaps be best understood if a few minutes are spent on describing the size, nature and structure of the company it aims to serve

Smiths Industries Limited is a public company whose 1977/78 turnover had a value of £255 million, yielding a trading profit of £24 million and a profit before tax of £22 million.

The company employs around 20,000 people at several sites in this country and at manufacturing sites in Scandinavia, North America, Australia, New Zealand and South Africa and in other subsidiary companies in Belgium, France, Germany, Holland, Japan and Singapore.

Its principal activities relate to:

- equipment for motor vehicle manufacturers;
- equipment for the motor trade;
- aerospace equipment;
- marine equipment and maritime services;
- medical supplies;
- tubing and building supplies;
- industrial equipment and instruments;
- in-car entertainment equipment;
- clocks and watches;
- distribution.

Around 54 per cent of the company's annual turnover is in the UK and the remaining 46 per cent overseas. Around 70 per cent of the business is in manufacturing and 30 per cent in distribution.

Over the years there has been much discussion in the literature of the differences between decentralized and divisionalized companies. If it is accepted that decentralization is the devolution of authority to make decisions and that divisionalization adds the concept of delegated profit responsibility to decentralization, then SI is a divisionalized company and this, in turn, means that it is highly decentralized.

The organization structure was established about ten years ago and there are now just over fifty separate trading units and a relatively small but very high calibre headquarters operation comprising corporate staff and services. Some corporate staff and services functions are mandatory in that the divisions or trading units *must* use those services and are not permitted to seek other sources outside the company. These mandatory functions include the Corporate Finance, Secretarial, Legal and Patent Services. In addition, there are other corporate services which as well as serving the corporate centre are available to all divisions on a normal, commercial basis. Divisions are under no obligation whatsoever to use those services and they may, if they wish, either buy such services outside or include such functions within their own divisional operations. It is into this last-mentioned category that the Corporate Market Research and Information Services Department falls. The divisions, if they so wish, can set up libraries, information departments, and/or market research sections within themselves or they may buy such services from external sources. Thus inherently the department is in competition with other bodies able to offer services of a similar kind.

In practice, there are two or three other small libraries on different sites but aside from holding some specialist publications of relevance only to their own sites, these small departments tend more to act in a liaison capacity between the site and the Corporate Information Department. There is very little, if anything, in the way of separate marketing research facilities within the divisions and substantially all market research is commissioned from or through the corporate department.

SI's Corporate Market Research and Information Services Department

So far as the money available for the department is concerned, it is a critical requirement imposed by the SI Main Board that the department must each year recover its total operating costs. This it has managed to do ever since that criterion

was set some twelve years ago and in those years when the department has made a small profit, that profit has been happily accepted at the corporate centre. The department is also free to sell its services outside the company, always providing that there is no conflict of interest. Thus theoretically the department could be developed and could grow as independent firms of consultants have been developed and have grown over the years, always provided that the department's management had the capability to achieve such growth profitably. However, SI as a company is *not* in the business of offering market research consultancy or library and information services and thus throughout its history the department has essentially been tailored to meet the anticipated needs of SI.

Over the years, the department has varied in size, structure and composition and to date—and for some years past—it has operated with a very small, internal staff whose services are supplemented, as required, by buying in a range of services available from outside the company.

The department is staffed thus

Head of department	1
Information officer and librarian	1
Information assistant	1
Typing and clerical staff	4

It is perhaps worth commenting here on the role of the head of department because this has a major impact on the mode of the department's operation. This is a senior appointment within SI and throughout the department's history its head has been also part of the small staff concerned at the corporate centre with the company's forward planning. More recently, the head of department has been one of a small team, under the direction of the executive vice-chairman, charged with the principal responsibilities for developing the company's forward strategy worldwide and for the formulation and co-ordination of technical policies.

The seniority and comprehensive nature of the post, as well as giving the department valuable 'clout' in the corporate context, also exposes the department to the real information needs of units throughout SI. This enables it not only to react when requirements for information are placed on it by those units but also to make unsolicited offers of information for which there may be only a latent or incipient need at the time of the offer. Thus the exposure of units to potentially rewarding information, which may aid them in enhancing the success of their own operations, is also increased.

This small permanent staff is supplemented by freelance specialists whose services are used on an as-required basis and by consultants with whom larger assignments are placed from time to time. Thus at present the full-time staff is supplemented by three freelance market researchers, one information assistant and two typing and clerical people. None of these works for the department on a full-time basis and the size and composition of this freelance team tends to change every three months or so. The services of consulting firms are used by the department only in relation to market research projects.

The financial year runs from August through July and the costs of running the department for the financial year 1978/79 are itemized as follows:

Salaries (inc. pensions and National Insurance)	21%
Temporary clerical services	1%
Travel and entertaining (inc. company car expenses)	2%
Stationery	1%
Machines hire and maintenance	4%
Overheads	6%
Consultants	40%
Information services	7%
Periodicals	10%
Books and publications	8%

The costs associated with the use of freelance staff and with the employment of consultants are aggregated under the heading of *Consultants* and these were unusually high in the year 1978/79 because of some major market research projects undertaken in that year.

The *Information services* item covers the purchase of the SRI Business Intelligence Programme Service and of the Arthur D. Little Impact Service and the cost of other information bought on a substantially *ad hoc* basis from other sources. Thus if Aslib, for example, is asked for and provides information via its on-line service, the costs of that purchase are included in this item of the cost statement.

The *Periodicals* item embraces the costs of subscriptions to journals and like periodicals which are bought either for use within the department or in support of the journals circulation service operated by the department for practically every unit of the company based in this country

The department's permanent book library collection is now very small and has been reduced over the last ten years although its holding of reference sources is extensive and is kept updated. Thus the *Books and publications* item includes very few purchases of books for the permanent library collection although it does, of course, take in the cost of the annual purchases of reference sources. It includes, too, the costs of books and all other publications bought for and at the request of individual divisions and supplied to them for permanent retention. It covers also the cost of purchase of *ad hoc* reports published by external organizations, bought either for the department's own use, to meet specific requests from divisions, or for offer on a shared-cost basis to those divisions likely to have a specific interest in the topic covered by any such report.

Those costs were recovered in total and a small profit was made. The 1978/79 departmental recoveries are described in broad outline thus:

Books and other publications	16%
Periodical subscriptions	8%
Photocopying	2%
Market research services	55%
Information search charges	19%

It is not possible to make direct correlation between the items shown on the cost statement and the items shown on the recoveries statement because, for example, some of the publications included in the *Books and other publications* item on the recoveries statement include those obtained as a result of subscriptions to certain information services. This recovery item also includes the charges made for book

loans whether these are provided from the department's own limited collection or borrowed from other libraries, as well as the costs of providing photocopies of material taken from journals and other sources.

The *Photocopying* item in the recoveries statement relates only to straightforward photocopying and binding jobs carried out for other SI units and performed by one of the clerical assistants on one or more of the department's machines.

The somewhat idiosyncratic inclusion by SI of its market research function within this department probably clouds the issue so far as this conference is concerned. For this reason the market research content of the department has been extracted and the operating costs of the library and information services provided by the department and the recoveries directly attributable to that part of the department's activities are described as follows:

Expenditure	
Salaries	23%
Freelance fees	4%
Direct purchases	52%
Overheads and other expenses	21%
Recoveries	105%

In the light of the structure of the company which was commented on earlier, it may be of passing interest to look for a moment at the split among the services provided by this small corporate department to its sister departments at the corporate centre, and those provided to the operating groups, divisions and other units, both in the UK and overseas. This is described in Table 1.

TABLE 1 1978/79 Recovery of costs for library and information services (approximate percentages)

	Books and other publications	Periodicals	Photocopying	Search fees	Total
Corporate management and services	10%	9%	3%	15%	37%
Operating groups and divisions (UK)	24%	9%	2%	25%	60%
International	2%	—	—	1%	3%
Total	36%	18%	5%	41%	100%

Information services offered

The services offered by the department are thought to be very similar to those offered by small libraries and information departments in firms throughout British industry. It is highly probable, however, that they do not match the calibre of the high-level

library services operated by professional librarians in some companies. In particular, the facilities for browsing and systematic searching by users outside the department are severely limited, primarily because space itself is limited but also because full cataloguing was abandoned many years ago. The primary source material held permanently is very small in quantity but visiting users are welcome to use the very wide range of indexing services bought by and held in the department; departmental staff will then acquire for the user any publication traced as a result of such searching. However, the majority of searching is carried out by the departmental staff themselves. The main visitors to the library are those seeking commercial and business information available from the multiplicity of directories held.

Thus, as in similar departments, a books purchases and loans service is operated in response to specific requests. Because the department's own book collection is small, there is fairly extensive borrowing of books from outside sources but there is much more extensive purchase of books where the need for them is likely to be on-going rather than one of transient interest. Thus long loans are positively discouraged, particularly by the charging system operated in relation to them, which will be described shortly.

Similarly other publications, ranging from leaflets through standards through full-bodied reports, are bought for those needing them or, in exceptional cases, are obtained on loan.

Any books or publications located by departmental staff in the course of their day-to-day operations (i.e. on an *ad hoc* rather than a systematic scrutiny basis) likely to have real interest for any part of the company, are specifically brought to the notice of the individuals in divisions or other units who are most directly concerned with the topic and they will then come back with requests either for the publication itself or for further information about it, if they so wish.

The department also operates what is believed to be a somewhat conventional periodicals service in that it obtains for and supplies to individuals or groups of people the periodicals they wish to see on a regular basis. In other words, it services the subscriptions to those periodicals and arranges for their circulation. As new periodicals become available, details of them are sent to those most likely to have interest in the subject matter and if this assessment of interest proves correct, then they, too, fall into this circulation system.

Increasingly, and especially as an aid to the senior management of the company, copies of the contents pages of certain periodicals are sent direct to individuals who then come back with requests for copies of those articles of particular interest to them. This not only eliminates the delays inevitably associated with circulation of journals but also enhances the awareness of the availability of topical information.

The offer of similar contents pages services by outside organizations such as the British Library and EDBISS (European Directory of Business Information Sources and Services) with its Management Contents service is now enabling us to extend the service beyond the periodicals regularly received.

Some of the periodical literature is kept under fairly close scrutiny by departmental staff and in some instances the contents pages service is even more finely tailored in that certain articles or papers are brought specifically to the notice of individuals likely to find them useful and who can then be supplied with the full document on request—and at a cost.

This is, in a sense, a selective dissemination of information service except that it probably does not warrant that formal designation, in that the resources needed to promote and operate such a service rigorously are not available and have not yet been built up within the department.

The major part of the department's time is concerned with extracting and providing information of all kinds in response to requests coming from all over the company. Because of the limited amount of truly fundamental research and development work carried out within SI, the requests for scientific information—as distinct from technical or technological information—are relatively few. Thus mainly the department is concerned with the provision of technological—primarily in the engineering fields—and commercial information, and what is requested ranges from highly specific items through to those for, say, state-of-the-art reviews.

In the course of its market research activities, the department collects a wealth of business and technological information and this is not only used in the course of the project for which it has been collected but, where relevant, is offered in the form of separate items to those people likely to have a direct interest in it.

In some ways, it would be pleasant merely to respond to requests for information and to meet those requests as professionally as is possible but it is much more stimulating to seek out other users likely to have an application for the information so acquired. This attitude also results in the department playing something of a cross-fertilization role within the company.

All this being said, it is clear that the department performs only a 'common-or-garden' information provision service, it may be a little different from some—but by no means all—of its counterparts in other firms in that it has developed both reactive and promotional roles.

Recording and charging procedures

When the department started operating in its present mode, possibly the most difficult task was the institution of a procedure which would ensure that every single enquiry was logged as it was received, even if it could be dealt with at the time the request was made. The disciplines are now well-entrenched but the difficulties of establishing them have not been forgotten.

Every member of the department has or has access to a log. These log sheets are primitive but have been deliberately kept as simple as possible. The details of a request are entered on a sheet immediately on receipt—or immediately afterwards if the request is dealt with during a telephone conversation. The action taken and the results of that action, together with a note of the costs involved in achieving those results, are subsequently noted. This is a very simple clerical procedure—somewhat tedious to describe—but it is essential that it is operated rigorously so that all costs are properly controlled and subsequently charged out. Handling times for searches and like tasks are, of course, noted because these have a direct bearing on ultimate cost but where requests are dealt with very quickly, then times are not noted but those tasks are aggregated and taken into consideration when the monthly service charges are calculated. This may seem a somewhat arbitrary approach which would probably appal any work study engineer but cost accounting is not a prime function of the department, the department itself is very small—there is no slack in it—and it is a

simple task at the end of each week or month to assess the cost of the labour and associated overheads involved in meeting these *ad hoc* requests—as distinct from requests for information involving measurable search time—for any division.

Those are the procedures operated in relation to requests for books, all other types of printed literature, and all types of information

So far as the periodicals service is concerned, the work and associated costs involved are re-charged at the times subscriptions are renewed each year. In instances where a subscription is serviced on behalf of an individual receiving a periodical, then that person is charged with the subscription itself and with the costs of handling that subscription, i.e. giving renewal instructions to the publishers, paying the subscription, ensuring that the records are kept up to date and monitoring the regular receipt of the periodical where it comes through the department. Where a periodical is circulated to a number of people, the servicing and handling costs are naturally higher but these and the cost of the subscription itself are then allocated among all the people receiving the periodical.

A charge is also levied for the contents pages service but this is included in the search fees which are charged either monthly, quarterly or half-yearly in accordance with use.

Where the department works virtually as a sub-buying office, i.e. in the acquisition of books and publications, these are charged at cost, unless any exceptional services have been incurred in obtaining them when the appropriate handling charges are added. Otherwise the services involved in such acquisitions are aggregated from time to time and their costs included in the search fees.

Loans, whether these are of books held in the department's collection or of books obtained from outside collections, are charged at a basic rate per month (or shorter period) regardless of the cost of the publication concerned. Thus if such a loan is held for more than one month, additional monthly charges are incurred. There are, of course, peripheral services designed to ensure that users only borrow—and thus pay—for books likely to be of real use.

Copies of papers, articles and other literature, whether these are provided from the department's own periodicals collection or from, say, the British Library's photocopy service, are supplied and charged on a similar basis.

The straightforward mechanical photocopying service offered by the department is charged on the normal 'per sheet' basis operated by most photocopying departments or services.

Each month—or each quarter or half year if more appropriate in the light of more limited use—user divisions and other units receive itemized charge sheets from the department, those charge sheets being sent through Corporate Accounts which has the ultimate responsibility for transfer charging and the monitoring of the department's accounts.

In turn, each month the department itself receives a cost statement from Corporate Accounts which itemizes its expenditure over the preceding month and its recoveries in the form of charges placed on its user divisions and units

Summing-up

In very rough outline, therefore, this is how the department operates.

The basic requirement that it must recover all its costs has imposed quite severe

disciplines on the department but, in turn, this has given it a substantially higher degree of flexibility in that there are no restrictions on the scale or structure of its operations, always provided that it can find users prepared to pay for any extended services it may try to offer. The decision on whether and when to buy supplementary services from outside the company is one entirely within the province of the department itself and this means that the nature and extent of the services provided through the department can vary substantially from year to year.

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Modelling on-Line Cost-Effectiveness

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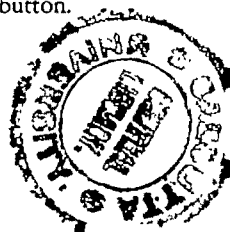
OVER THE PAST three years, the use of on-line facilities for retrieval of bibliographic information from large commercial data bases has steadily increased. In most cases, the facility offers enormous advantages in terms of speed and overall effectiveness, particularly as far as industrial information units are concerned, but of course increased usage has been accompanied by mounting—and very visible—bills in respect of data base access and telecommunications charges.

It is not surprising, therefore, that efforts have been made to measure the cost-effectiveness of this facility in comparison with traditional manual searching procedures. For example, Elcheson¹ and Elman² have carried out studies based on full costing of the human effort and the associated charges involved, and conclude that such on-line searching is generally cost-effective.

In 1977, the Company Information System of ICI (a federation of the company's information units) appointed a study team with the remit of investigating and reporting on the cost-effectiveness of on-line information retrieval processes. Details of this investigation have been reported elsewhere³ but in summary, the findings were that on-line searching of external data bases was 24 per cent more cost-effective than equivalent manual searching, with the exception of patent searches, which required high recall and generated large quantities of off-line prints. This quantitative finding was also supported by qualitative statements of the benefits conferred by on-line search techniques. These collected opinions tended to support the view that the quality of the on-line end product was at least equivalent to, and possibly superior to, that of the manual process.

The procedure used in calculating the cost-effectiveness of on-line working was based on the techniques described by Magson,⁴ using averaged data obtained from six different sources across the Company Information System. Most of the data were fairly consistent, but some variation was evident in particular cases, which could have led to argument over the validity of the final figure.

For this reason, a simple cost model, embodying the basic calculations, was constructed. This allows the appropriate data to be varied and the effect on the cost-effectiveness figure to be determined accordingly. The model is detailed in simple mathematical terms.⁵ It allows specific data to be manipulated easily, but since simulation exercises involving several variables become more complex and tedious, the model was later programmed for a small micro-computer, enabling the effects of multiple data variation to be displayed almost instantaneously at the touch of a button.



Expression of cost-effectiveness

It may be appropriate at this stage to recapitulate the definition of cost-effectiveness and the method of expression used in this paper: 'Cost-effectiveness is a method of rigorous and systematic examination of alternative courses of action for presenting to management the relative worth of each alternative in terms of specified objectives'.⁵ The difference between cost-effectiveness and cost-benefit analysis is explained by Flowerdew and Whitehead,⁶ who also quote many references in their survey of work in the field.

'Worth' may comprise either qualitative statements of the advantages/disadvantages of possible actions, related to appropriate costs, or may be expressed in quantitative terms, for example, the difference between two sets of alternative costs. We find it most convenient to quantify cost-effectiveness in terms of the difference in alternative costs expressed as a percentage of the actual costs.

Thus if a present procedure costs C_a and the alternative cost of achieving the same end result is calculated to be C_b , the cost effectiveness figure is represented by

$$\frac{C_b - C_a}{C_a} \times 100.$$

It follows that a figure of 100 per cent means that the best alternative would cost twice as much as the present procedure, whilst a figure of zero means that the costs are the same and a conscious choice may be made on the basis of qualitative criteria. Although by no means an essential feature, expression as a percentage figure is useful for ranking purposes if several alternatives are considered, and for rapidly detecting changes in the situation if the calculation is reworked with new data at frequent intervals.

Types of models

There are many different kinds of models. The ones familiar to most people are *iconic*, or physical models which look like the real thing. *Analogue* models use a particular physical property to represent the original, such as a piece of card on a planning board, in which the length of the card equates to time. *Mathematical* models, sometimes called symbolic models, represent relationships between symbols in mathematical terms, an elementary example being: circumference of circle = $2\pi r$.

There are also verbal models and other devices, but the subject of this paper is based on mathematical modelling. There are broadly speaking three types of mathematical model. *descriptive*, *exploratory* and *optimizing*.

All models are descriptive, but some can be 'driven' by an operator, so that one can ask the question 'What would happen if . . .?', or, as in the third case, 'Which is the best solution to this problem?' The model to be described is of the exploratory type; it is capable of processing real data to give factual answers, and can simulate hypothetical situations. The optimizing facility is not built in but is carried out intellectually from the output data produced. The modelling of information systems is by no means new. Extremely elaborate cost models, designed to assist information managers and librarians in budget and cost control matters, have been described by Dammers,⁷ Vickers and Rowat,⁸ and Rouse and Rouse.⁹ On the other hand, simple mathematical expressions, related to on-line searching effectiveness, are described by

Elcheson¹ and Elman² and also by Wish, Collins and Jacobson.¹⁰ Other types of models, applied to specific areas of library and information work, have been described in the literature.¹¹⁻¹³

Modelling can be as simple or as complex as one desires. The important point is that highly complex models demand substantial programming effort, coupled with a need for mainframe or equivalent computer facilities. However, simpler versions, perhaps relating to a particular activity or function of information work, can be fairly quickly programmed for mini- or micro-computers. Unfortunately, such software cannot be bought 'off the shelf' at present and in-house programming is necessary. This is also true of other software, such as simple indexing for store and retrieve programs. There is perhaps a case to be argued for establishing some form of software exchange system, maybe through some national body such as Aslib, or the National Computer Centre, enabling newcomers to the technology to acquire 'standard' micro-computer programs which meet their needs, thereby avoiding rewriting and unnecessary duplication.

Building the cost-effectiveness model

The first step in the process was to analyse both on-line and manual search operations and to define the cost elements in each case. This procedure was greatly facilitated by the composition of the team, which comprised two practitioners highly experienced in both types of searching, plus two members experienced in problem analysis and critical examination techniques. Pooling of these resources soon gave rise to an agreed list of basic elements. At a very early stage, the need for simplicity was recognized. For example, it was felt that there was no need to separate the costs of off-line prints, postal charges and telecommunications costs from the total data base usage charges. In a more elaborate model, these elements could be identified and introduced as variables, if desired. The basic cost elements were, therefore, defined as: *the total effort associated with on-line search*, being the sum of pre-search strategy time, actual search time and post-search analysis time converted to man years. This, multiplied by the appropriate salary level (with overheads added) and the number of searches for the particular year, gave the effort cost, which was added to *the annual data base costs*. To this sum was added the cost of renting a terminal (alternatively, the depreciation figure if the terminal had been purchased), giving *the total on-line operational cost for one year*.

Study of the equivalent manual operation showed that it was impossible to separate out the time spent in pre-search formulation of strategy—this feature always developed concurrently with the search. Post-search analysis was, however, identifiable and quantifiable. The total manual search time was then converted to effort cost as described above, that is, multiplying by salary plus overheads and the same number of searches per annum.

In this manner, the key elements were defined and equations were constructed, keeping some options open. For example, additional elements, representing training costs, were added to both processes. So far, this option has not been used to any great extent, on the argument that all professional staff require some measure of training in, and ongoing awareness of, new developments, irrespective of current operating procedures.

Data collection

Having defined the elements required to calculate the cost effectiveness of on-line working, the study team was now faced with the problems of establishing corporate data, reflecting the experience and appreciation of many information units across the company. Accordingly, six of the eighteen UK-based information centres in ICI were invited to participate in the data-raising exercise. Three members of the team then interviewed the manager and senior staff of two units in their locality, whilst the fourth team member supplied details of accounts, extracted from head office records.

The interview technique was preferred because both hard and soft data could be collected. It is fairly well established that hard data (solid fact or recorded numbers) can be satisfactorily collected by means of a 'closed'-type questionnaire. However, if soft data (for example, statements of opinion, individual forecasts or general ideas) are to be sought, an 'open' questionnaire or direct interview is preferable. In this particular case, qualitative statements of opinion were requested in relation to the perceived advantages or disadvantages of on-line working. Accordingly, the team compiled a list of questions to be used as an *aide-memoire* in the course of the interviews. The list included questions covering:

- a* number of searches conducted by the unit during the past year(s)
- b* proportion of on-line/manual searches for each period
- c* search elements and time factors, on-line and manual
- d* numbers and salary grades of staff involved
- e* associated clerical or secretarial time/salary levels
- f* billed costs (data base and telecoms charges) as percentage of budget
- g* forecasts of growth in on-line demand and supply costs
- h* related educational and training costs (as charged items)
- i* time spent in keeping up to date with the technology (current awareness)
- j* statements of opinion relative to on-line working compared with manual searching
- k* estimates of user time in each case

On completion of the exercise, the team met to compare the returns and to agree on the best (numerical) averages to use in the overall calculation.

When summarizing and merging the collected data, the following observations were made and may be of interest:

- a* In 1977, the average proportion of on-line to manual searches was 1.5:1. This ratio was expected to increase rapidly with the spread of the new technology.
- b* All returns for on-line time spent at the terminal were completely consistent at fifteen minutes per search; every unit returned the same figure.
- c* In most cases, only slight variation in pre-search and post-search times was recorded.
- d* The clerical/secretarial support element was discarded, as it was found that such work had been effectively absorbed by the information unit staff.
- e* Returns for billed costs as a proportion of the unit budget varied between 0.1 per cent and 3 per cent depending on the nature of the business and on the length of time in operational service. On a corporate level, on-line costs were less than 1 per cent of the Company Information System's total annual budget—a remarkably economic figure in view of the benefits gained.

- f* In 1977, the forecast of growth in on-line working was 60 per cent expressed as annual billed cost increment. In fact, the actual figures for 1978 for both costs and number of searches were 40 per cent higher than in 1977, probably reflecting an increasing expertise in the ability to extract more information per search session.
- g* Some data relating to education and training were collected but were not used in the cost-effectiveness calculation.
- h* Statements of opinion with regard to the advantages/disadvantages of on-line working were fully consistent across the units consulted. These opinions were correlated and refined, and are listed.³ The consensus view was that on-line working offered substantially more advantages than disadvantages

Results and variations

First calculations showed that the general cost effectiveness ratio of on-line versus manual searching of external data bases, based on 1977 averaged data, was 24 per cent in favour of on-line, with one notable exception. This was in the area of patent searching, which generated large quantities of off-line prints, with attendant higher charges, plus additional effort in post-search analysis. The result was a negative cost effectiveness figure for on-line patent searches.

For 1978, the averaged data representing general searches on-line gave a cost effectiveness figure of 35 per cent. Preliminary results for 1979, based on first quarter data, indicate that the cost-effectiveness figure might be in the region of 70 per cent.

We can feel fairly confident, therefore, that on-line searching has been, and will continue to be, a profitable feature of the company's information services, and that visible costs can be adequately justified to top management as and when necessary.

The foregoing results are based on real data, but when the model was later programmed for a Commodore PET micro-computer, it became possible to simulate hypothetical situations; that is, to rapidly calculate the effects of data variation on the cost-effectiveness figure. For example, it was soon shown that the model was extremely sensitive to changes in time factors and salary/overhead levels. If a higher salary level, representing that of a research scientist, was introduced in place of that of an information scientist, the cost-effectiveness figure increased dramatically by a factor of three. Yet, in a real life situation, the average researcher could not be as familiar initially with the procedure, so that the effect would probably be countered by positive training and increased time factors associated with a search. Where these factors are increased, the overall cost-effectiveness is very much reduced, offsetting the gain due to the higher salary level. However, the learning curve would operate and several simulations might be carried out, reflecting a progressive gaining of expertise and diminishing training needs. The effects of inflation can also be tested, in line with projected increases in external data base bills and telecommunication charges, perhaps assuming pay freezes or anticipated settlements, all coupled with the envisaged local growth in on-line searching.

Although primarily designed to calculate cost-effectiveness, the program also provides useful summaries of the basic data, such as total billed costs over the period, total effort expended and the cost of this effort. Useful ratios are also calculated and displayed; for example, costs per search, total search costs per minute, on-line costs

per minute and so on. If required for record purposes, the data can be easily recorded on a domestic-type cassette, or transferred to a diskette for storage. Line printer attachments are also available if hard copy is preferred.¹⁴

Conclusion

The advent of microprocessor technology offers information units a remarkable range of facilities. For development work, simple models as described above can be constructed and programmed, enabling real data to be processed or various assumptions to be tested. In the case under review, the model relates to one specific part of information operations, and to a particular area of the total budget. There is no reason why other sections of the budget should not be treated in a similar manner, enabling the effects of envisaged changes in, say, staff and salary levels, or purchases and other outgoings, to be rapidly calculated and displayed.

This numerical capability is, of course, only one small part of the range of facilities offered by micro- or mini-computers, which will undoubtedly find increasing applications in other spheres. Experiments with networked micro-computers are already under way, aimed at exploring the possibilities of quickly conveying new information to users—current awareness, if you like—and at the same time reading the information to one's own internal data base. In stand-alone mode, the possibilities are equally exciting, with the facility to generate small indexes of holdings, equipment listings, loan transactions and the like. No doubt other units will soon be experimenting along similar lines and reports of successful applications may be expected in the not too distant future.

ACKNOWLEDGEMENT

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Discussion

SESSION 2

P. VICKERS (Aslib). I would like to thank Maurice Magson for his reference to the work that Martyn and I did some years back and to say that we at Aslib are receptive to the idea of a clearing house for micro-computer software. This features in our research programme for 1980-2 and we are already doing some exploratory work. Depending on how portable the software turns out to be I am sure we shall be able to respond to this need. The second point is that you referred to the manual searches and on-line searches as though they were equivalent. Is that a fair assumption or were the manual searches of a particular kind which you couldn't have done on-line?

MAGSON We were very careful to ensure that we were matching the same type of search; we were not able to compare by doing the same search both manually and on-line but we did exclude searches which could not be done on-line.

M S DALTON (Unilever). With regard to your comparison between the twelve people searching manually and the two and a half searching on-line, the option you mentioned was to get rid of the extra people, but other options include maintaining the same level of supply but finding more enriching things for the odd nine people to do in the information sphere; or increasing the level of supply because in most information services demand nearly always exceeds supply.

MAGSON Yes, of course. Turn the problem into an opportunity!

D MASON (CLW). Did you make the assumption in comparing manual and on-line searching that both would require the same back-up materials, i.e. that you would go on purchasing the hard copy, and that the cost of these was therefore ignored in the model?

MAGSON Yes, that is correct.

J B WHITEHEAD (Pilkington Bros.). We have found that since we started using on-line searching the cost of our borrowing has gone up by about 400 per cent, and this is certainly not trivial.

MAGSON No but, remember, our searches were carried out about two years ago and at that time such additional costs probably were small compared with what they might be today.

F BLAMOUTIER (CNRS, France). Did you compare costs of manual searching with off-line computerized searching? We generally use a combination of both methods to find the most effective and inexpensive way.

MAGSON No, we would have found it very time consuming to gather the necessary data for a study on batch searching so we decided to omit this aspect at least for the present.

J. RAY (British Rail). Can I ask Mr Edwards if he had ever considered using Mary Griffin's charging system in his own company?

EDWARDS No, because we are not a divisionalized company for which the technique seems to be particularly relevant. I wouldn't rule it out in the future as a method of allocating costs to product groups.

J. BLAGDEN (Cranfield Institute of Technology): Mr Magson mentioned quality. Could he say how this was determined?

MAGSON By question and answer.

BLAGDEN But if you are using different questions how can you compare the quality of the answers?

MAGSON The team agreed a set of questions which they were going to put to other operators and users. They then got together and compared notes on six sets of returns containing qualitative expressions of opinion. So it was possible to get a fair idea of comparative quality.

BLAGDEN: But were these expressions of opinion based on specific observations of particular manual or on-line searches or were they based on generalized attitudes towards on-line and manual searching?

MAGSON Probably a bit of each.

P. DUCKITT (Wellcome Research): Has any attempt been made to input data from other models into the one you describe? I'm thinking particularly of the data in the Barwise report which suggests a fairly massive increase in on-line royalties in two or three years time.

MAGSON So far we haven't raided other people's data but it would be possible to do so.



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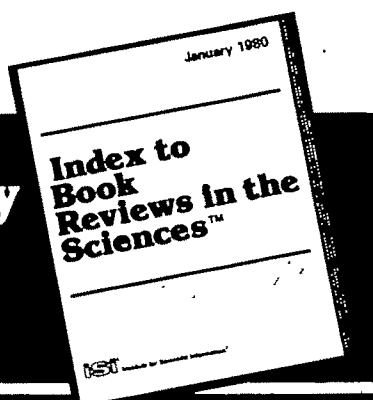
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Introduction

ONE OF THE major objectives of the Commission of the European Communities is the creation of a common market for scientific and technical information within the Community. In collaboration with CIDST (Committee for Information and Documentation on Science and Technology) the Commission's activities have been concentrated in three main areas:

the creation of a packet-switched telecommunications network called EURONET;
the development and improvement of information services within the Community,
the development of technology with particular emphasis on systems for automatic translation.

However, the great majority of the significant data bases becoming available on EURONET (or EURONET/DIANE as it is now called) will be of American or international origin and, although the number of European bases, particularly non-bibliographical bases, may be expected to increase with time, the present situation is far from satisfactory.

In the past both CIDST and the Commission have tended to concentrate on the development of large intergovernmental systems of the INIS/AGRIS type and programmes have been limited, in general, to certain subject fields such as agriculture, environment, metallurgy and energy. The limitations of this approach are now clearly recognized and a new initiative, in which future developments will depend very largely on an approach to the information industry, is being considered.

In contrast to the situation in America, the expected transition in Europe from primarily public sector to private sector data base projects is not taking place for a number of reasons, some of which are only dimly perceived. To achieve one of the main objectives of the Commission's Second Action Plan, i.e. the development of the European information market, a much more open approach to service development is needed and for this the co-operation of the industry is essential.

The Commission have therefore sought to embark on discussions with representatives of the European information industry prior to the formulation of the Third Action Plan in 1981; to start the ball rolling a meeting of representatives of the industry with the Commission was held in Luxembourg on 25 June 1979. To provide a basis for discussion at this workshop, the Commission placed a contract with INSPEC to arrange for the preparation of four position papers, each looking at different aspects of the problem, with the kind permission of the Commission, those four papers are reproduced here together with a set of the workshop's recommendations, which will be considered by CIDST.

The problems which were discussed at this meeting and which are summarized in these papers are of major importance in determining the development of information systems and services in Europe in the next few years and as such are of interest to both suppliers and users of information. It is hoped that the publication of this material in *Aslib Proceedings* will assist in stimulating as wide-ranging a debate as possible.

L. J. Anthony
Aslib

An analysis of the present European situation

T. M. Aitchison

INSPEC

The growth of the reference data bases available and networked in Europe is described and the numbers of data bases originating in Europe and outside Europe are compared. The balance of payments in data base and on-line revenues is discussed. The development of source data bases in Europe originating both in and outside Europe is described and the American experience is quoted. The greatest European deficiency is shown to be in business and economic data banks. The public and private sectors of the information-transfer complex of operations is discussed and the information industry in the USA and Europe is compared.

Clarification of terms

TO ASSIST IN the discussion of this and subsequent papers, it is desirable to clarify the use of 'Europe' and 'European', the various types of information operation, the types of organizations conducting these operations, and in particular, the term, 'information industry'.

Information industry: the commercial generation, operation and use of data bases and data banks. (Thus newspapers, periodicals and books are not included but printed abstracts journals, data compilations and indexes are included as products of data bases and data banks as well as on-line services.)

Europe: normally used for the nine countries of the EEC but may include other Western and Eastern European countries when a comparison is made with the USA or the rest of the world.

European: originating in or based in Europe. In these discussions it will be taken to include the European manufacturing and operating subsidiaries of American and other multinational corporations.

Types of information operations

- | | |
|--|--|
| a Reference data bases | Contain representations of the original information; |
| Bibliographic data bases | indicate where it may be found. |
| Referral data bases | |
| Data bases (used alone to differentiate from data banks) | |

-
- | | |
|--|--|
| <p><i>b</i> Source data bases
 Full-text data bases
 Numeric data bases
 Hard data bases
 Data banks (used to differentiate from data bases)</p> <p><i>c</i> On-line services
 On-line vendors
 On-line suppliers
 Hosts (EURONET)</p> <p><i>d</i> Timesharing services
 Network information services
 Remote computing services</p> <p><i>e</i> Integrated services</p> <p><i>f</i> Custom information services
 Information brokers
 Information retailers
 Intermediary information services
 Information consultancies</p> | <p>Contain the original information. This may be numeric, full-text or other but is distinguished by providing information directly, <i>not</i> by reference to another source of information.</p> <p>Provide on-line access, mainly to reference data bases.</p> <p>Provide on-line access to source data bases or data banks and often allow users to manipulate on-line data retrieved.</p> <p>When the organization producing the data base also provides the on-line service. These are more frequently source data base producers and timesharing services.</p> <p>Providing on-demand computer searches, SDI, special reports and analyses of information research studies.</p> |
|--|--|

Organizational types

- | | |
|---|---|
| <p><i>a</i> Government (government, quasi-government, university, college)</p> <p><i>b</i> Non-government (non-profit, not-for-profit)</p> <p><i>c</i> Private (for-profit, information industry, commercial)</p> | <p>Supported by central or local government funds, whether or not a charge is made for services to non-government users</p> <p>Organizations such as professional associations and societies which do not have shareholders to whom profits are distributed. Better considered as 'non-profit-distributing' since a profit may be made to support further development or expansion</p> <p>Organizations which seek to make a profit for distribution to shareholders, etc</p> |
|---|---|

Comparisons with the USA

In this brief survey of the European information scene, the main emphasis will be placed on those aspects which are likely to be significant in discussions on the future of the European information industry. The picture is thus bound to be highly selective and very incomplete.

Because most of the modern developments in information—the information explosion, computer retrieval, computer composition and photo-typesetting, remote access to data bases—originated in the USA or were developed more speedily and effectively there, there has been a tendency to measure European development in this area mainly by reference to the corresponding American developments. Since this is

TABLE 1 EUSIDIC Survey 1 January 1979; on-tape and on-line availability of bibliographic files begun 1963-1970

	1963-1964	1965-1966	1967-1968	1969-1970	1971-1972	1973-1974	1975-1976	1977-1978
<i>Government</i>	NASA	on-line ERIC		on-line				
			MEDLARS ENDS* NSA	on-line	on-line			
				on-line NTIS on-line CAIN		on-line		
				TOXLINE	on-line	on-line		
<i>Not-for-profit</i>	API	METADEX	GeoRef CACon Embase*		on-line	on-line on-line on-line		
				COMPENDEX BIOSIS INSPEC* SPIN		on-line		on-line
<i>For-profit</i>	SCI Ringdoc* WPI*						on-line on-line	
		ABS AHL					on-line	
			ICRS	GeoArchive* CPI CIS/Index				on-line

*European data bases

a convenient and generally-accepted method it will be used wherever necessary in this discussion paper.

Reference data bases or bibliographic files

The early development of bibliographic files and their availability on magnetic tape and on-line is shown in Table I. It will be seen that the European data bases are only six out of twenty-six before 1980.

Since that time the growth of machine-readable data bases has been remarkable, with an increase (see Table 2), between 1972 and 1978, from ninety-eight to 556 data bases available in Europe. There was a specially fast growth of non-science and non-technology data bases (from seventeen to 179) in the same period.

However the most noteworthy indication in Table 2 is the growth in European-originated data bases which now exceed in number those made elsewhere. It is clearly dangerous to set too great store by simple numbers of data bases, since the number of records they contain may vary greatly. The position in relation to the larger data bases is shown in Table 3, which at first sight would seem to show a very satisfactory state. However, on closer examination it will be seen that one million of the European records are due to INPADOC and that a further 2,180,000 are not directly comparable since they are in languages other than English. If these are removed (and similarly the 420,000 of JICST) the comparison becomes:

Made in Europe	1,210,000 records;
Made elsewhere	2,850,000 records.

On-line availability of reference data bases

The availability of data bases originated in Europe and those made elsewhere is shown in Table 4. It will be seen that there is almost parity. The greater number of European-made data bases in science and technology is rather more than offset by the smaller number in other subjects.

This tendency to parity in numbers of data bases available on-line is reflected in data for the growth of reference data bases available from one American on-line operator⁴ (Table 5).

Balance of payments in data base revenues

The increase in the number of European-made data bases available in Europe and elsewhere, and their approach to parity with the number of non-European data bases available in Europe, may be expected to reduce the economic imbalance between revenues earned outside Europe by European data bases and those collected in Europe by non-European data bases and services.

However this imbalance was extremely large, as may be seen from Appleyard's statement¹ of September 1978: 'more than 50 per cent of the total turnover of the European (on-line) market is now believed to go to the three major US services with no pounds sterling coming back and this may be the worst showing in balance of trade which the Community is showing in any branch'.

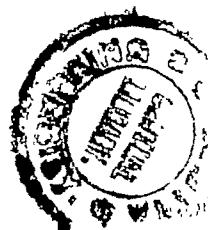


TABLE 2. *EUSIDIC survey 1 January 1979: bibliographic files by subject 1972 and 1978*

	made in Europe		made elsewhere	
	1972	1978	1972	1978
General	1	28	11	41
Agriculture	5	47	4	13
Biology	1	6	2	5
Chemistry	3	18	10	23
Earth and Space	1	9	1	2
Mathematics	1	5	3	0
Medicine	5	11	6	21
Physics	2	9	1	4
Sciences	18	105	27	68
Aerospace	0	2	0	1
Armed Forces	0	1	0	0
Civil Engineering	1	16	0	0
Electrical Engineering	3	13	0	5
Energy	1	3	1	7
Mechanical Engineering	3	18	0	4
Metals, Ceramics, Glass	2	10	0	4
Nucleonics	1	8	0	2
Paper, Printing, Packaging	1	6	0	2
Petroleum	1	2	2	3
Sea	1	3	0	2
Telecommunications	1	5	0	2
Textiles	2	2	1	1
Transport	1	4	0	7
Wood	2	1	0	1
Technologies	20	94	4	41
Art, Literature, Music	0	4	1	2
Business and Economics	2	12	2	12
Demography and Geography	0	4	0	6
Education	0	6	2	5
Environment	1	9	0	21
History	0	3	1	4
Information and Documentation	1	6	0	3
Law	0	10	0	7
Linguistics	0	1	0	2
Patents and Trade Marks	0	9	4	9
Philosophy	0	2	1	1
Public Administration	0	9	0	17
Religion	0	1	0	2
Social Sciences	0	3	2	7
Sports	0	1	0	1
Other	4	80	13	99
Total	43	307	55	249

TABLE 3 *EUSIDIC survey 1 January 1979: bibliographic files by records added per year*

	made in Europe	made elsewhere
<i>Files adding 1,599,000-800,000 records per year</i>		
INPADOC—patents	1,000,000	
<i>Files adding 799,000-400,000 records per year</i>		
IDC-Patentdatenbank—patents	700,000	
SCI Tapes—sci and techn.		520,000
PASCAL—sci. and techn	500,000	
Referativnyy Zhurnal—sci. and techn.	500,000	
WPI—patents	500,000	
CA—chemistry		420,000
JICST File—sci and techn		420,000
	2,200,000	1,360,000
<i>Files adding 399,000-200,000 records per year</i>		
BIOSIS Previews—biology		250,000
Embase—medicine	250,000	
MEDLARS—medicine		250,000
Information Bank—newspaper information		200,000
	250,000	700,000
<i>Files adding 199,000-100,000 records per year</i>		
CAB—agriculture	150,000	
(CT, subset of CA		150,000)
F and S Indexes—business		150,000
LIBRIS—books	150,000	
AGRICOLA—agriculture		140,000
Federal Index—national policies USA		140,000
(PASCAL chemistry, subset of PASCAL	130,000)	
(PASCAL medicine, subset of PASCAL	130,000)	
SSCI Tapes—soft sciences		130,000
(CAIN, subset of AGRICOLA		120,000)
CPI—conference papers		120,000
EDB—energy		120,000
Rungdoc—pharmacology	120,000	
IRL data base—life sciences	110,000	
MARC (Books)		110,000
(PASCAL biology, subset of PASCAL	110,000)	
Registre des Testaments—wills	110,000	
AGRIS—agriculture	100,000	
INSPEC A—physics	100,000	
GeoArchive—earth sciences	100,000	
Libcon/E—books		100,000
Wall Street Journal Newspaper Index		100,000
Washington Post Newspaper Index		100,000
	940,000	1,210,000
Total	4,390,000	3,270,000

TABLE 4 *EUSIDIC survey 1 January 1979: data bases made and networked: bibliographic files*

	made in Europe	networked to Europe	made elsewhere	networked to Europe
General	28	4	41	23
Agriculture	47	37	13	9
Biology	6	3	5	2
Chemistry	18	6	23	7
Earth and Space	9	2	2	2
Mathematics	5	1	0	0
Medicine	11	7	21	16
Physics	9	2	4	2
Sciences	105	58	68	38
Aerospace	2	0	1	1
Armed Forces	1	0	0	0
Civil Engineering	16	7	0	0
Electrical Engineering	13	3	5	2
Energy	3	1	7	2
Mechanical Engineering	18	12	4	2
Metals, Ceramics, Glass	10	3	4	1
Nucleonics	8	1	2	0
Paper, Printing, Packaging	6	6	2	0
Petroleum	2	2	3	3
Sea	3	1	2	2
Telecommunications	5	1	2	1
Textiles	2	2	1	0
Transport	4	3	7	5
Wood	1	0	1	0
Technologies	94	42	41	19
Art, Literature, Music	4	1	2	2
Business and Economics	12	5	12	11
Demography and Geography	4	0	6	3
Education	6	0	5	5
Environment	9	2	21	10
History	3	0	4	2
Information and Documentation	6	3	3	1
Law	10	0	7	2
Linguistics	1	0	2	1
Patents and Trade Marks	9	1	9	5
Philosophy	2	0	1	0
Public Administration	9	1	17	8
Religion	1	0	2	0
Social Sciences	3	0	7	2
Sports	1	0	1	0
Other	80	13	99	52
Total	307	117	249	132

TABLE 5: *Number of bibliographic files on Lockheed*

Year	66-68	67-70	71-72	73-74	75-76	77-78	79
Total	1	4	6	18	63	92	110
European-made	0	0	0	3	30	39	54

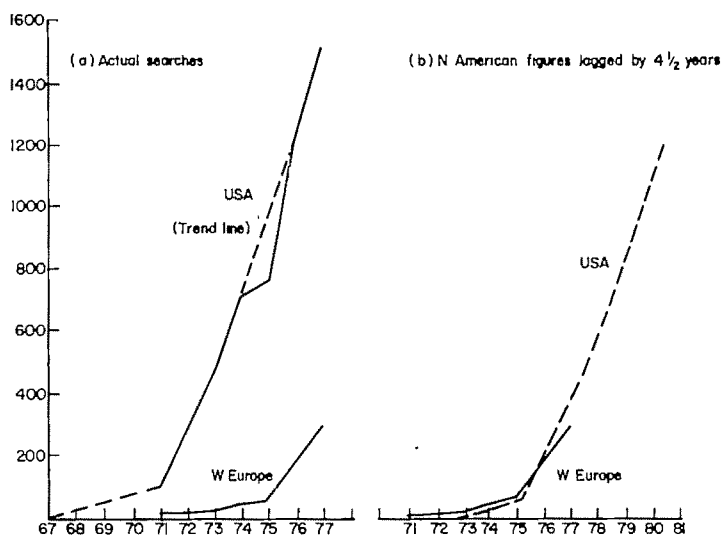
There are a number of reasons which may be adduced for the unfavourable balance of payments, in spite of the seeming parity in numbers of data bases:

The main US data bases—CA, BIOSIS, MEDLARS, SCI, NTIS, etc.—are well established and more widely used than the European data bases.

As mentioned above, a considerable number of the European data bases are in languages other than English. While this will be a hindrance to their wide use within Europe, it will be a severe barrier to their use outside Europe and particularly in the USA.

Since most on-line operators who provide services inside and outside Europe are American, the income derived by European organizations from on-line searching comprises only the royalties from European-made data-bases. On the other hand the payments made from Europe for on-line searching consists of both the royalties for non-European data bases and the on-line service charges for all data bases (both European-made and non-European).

The potential scale of the problem is seen in the estimates for the growth of on-line searching in Europe quoted by Appleyard¹. This is shown (for bibliographic data bases only) to follow the American experience with a lag of four and a half years.

FIG 1 *The on-line market (thousands of searches)¹*

If the American trend-line is followed the estimated 300,000 searches in Western Europe in 1977 are expected to increase to 1.2-1.5 million searches in 1982. In the same period it is estimated that the total revenue from on-line bibliographic searching will increase from 1.5-3.0 million pounds in 1977 to some fifteen million pounds in 1982.

The advent of EURONET-DIANE and the availability of American and other non-European data bases on EURONET hosts will reduce the on-line payments made outside Europe to data base royalties in these instances. However it is difficult at present to estimate the effect of these changes and the recent increase in European-made data bases on the overall adverse balance in 'on-line' trade.

Source data bases or data banks

With the increase between 1972 and 1978 of the reference data bases available in Europe there was an even sharper increase in the number of source data bases or data banks available, as shown in Table 6.

TABLE 6. *EUSIDIC Survey 1 January 1979: Bibliographic files and data banks 1975-1978*

	<i>Data bases in Europe</i>			<i>Data base Guide</i>	<i>Survey</i>
	1975	1976	1977	1978	1 1 79
Bibl files	335	337	422	533	556
Data banks	51	149	268	568	609
Total	386	486	690	1101	1165

Of these 609 data banks available in Europe, as will be seen from Table 7, 224 are produced in Europe and 385 produced elsewhere. The disparity becomes extreme (thirty-seven to 270) when one compares their on-line availability. This is surprising since data banks are said to be normally made available by time-sharing services which have their own networks.

Although there are interesting differences in many areas between the numbers of European and non-European data bases available and networked in Europe the most noteworthy is in Business and Economics where only thirty-six are made in Europe compared with 160 made elsewhere, and nine European data banks are networked compared with 143 originating elsewhere.

American experience of data banks

The following views, extracted from the LINK Study², reflect the American experience of source data bases or data banks and indicate how these differ from reference data bases.

Data banks are more frequently used on-line and a higher proportion of their revenue comes from on-line usage.

TABLE 7. *EUSIDIC survey 1 January 1979: data bases made and networked, data banks*

	made in Europe	networked to Europe	made elsewhere	networked to Europe
General	6	2	10	9
Agriculture	19	0	16	11
Biology	5	1	1	1
Chemistry	32	10	36	18
Earth and Space	19	1	1	0
Mathematics	1	0	0	0
Medicine	19	3	29	11
Physics	3	0	0	0
Sciences	98	15	83	41
Aerospace	1	1	0	0
Armed Forces	0	0	0	0
Civil Engineering	2	1	2	1
Electrical Engineering	7	1	4	4
Energy	2	1	9	5
Mechanical Engineering	3	0	4	3
Metals, Ceramics, Glass	3	1	6	5
Nucleonics	10	0	2	0
Paper, Printing, Packaging	0	0	0	0
Petroleum	1	1	10	9
Sea	3	0	5	1
Telecommunications	9	0	5	3
Textiles	0	0	0	0
Transport	1	0	11	5
Wood	0	0	2	2
Technology	42	6	60	38
Art, Literature, Music	1	1	0	0
Business and Economics	36	9	160	143
Demography and Geography	5	1	7	6
Education	3	0	5	4
Environment	1	0	21	9
History	0	0	0	0
Information and Documentation	0	0	0	0
Law	15	1	17	10
Linguistics	10	1	7	0
Patents and Trade Marks	2	0	2	0
Philosophy	0	0	0	0
Public Administration	2	1	11	8
Religion	0	0	0	0
Social Sciences	3	0	1	1
Sport	0	0	1	1
Other	78	14	232	182
Total	224	37	385	270

Data banks are produced mainly by commercial organizations whereas data bases are produced by non-profit and government organizations.

The return on investment is higher for data banks. These are generally smaller than data bases and users generally spend more.

Public and private sectors

In Europe there is a high degree of government involvement in information provision, not only, as in the USA, in the provision of information derived from government-sponsored scientific and technical activities. This governmental or public as opposed to private involvement takes place at a number of levels:

International and intergovernmental, etc. This is exemplified by the activities of UNESCO, ILO, FAO, IAEA, by INPADOC, CAB and IRS/ESA.

CEC. This includes ENDS, AGREP, ENREP/ENDOC. Possible involvement is currently limited to the three sectors: agriculture, environment and medicine, with a further special interest in legal information. A EURONET host will be provided.

National. Within the countries of the EEC, governmental or government-financed bodies produce data bases and data banks, and provide on-line services. In France the PASCAL and CDSH data bases are produced by CNRS; in Germany, data bases covering specific areas are being produced or developed by certain of the government-funded FIZ. In on-line operations, the governmental role is even more all-embracing with Info-line distinguished as the only major European on-line service operator for which government involvement is as a minority shareholder only.

Of the non-government or private sector, the largest in the production of data bases is probably the not-for-profit sector. This includes the research associations and professional bodies which produce such data bases as TITUS, INSPEC, WELDA-SEARCH, PIRASCAN and LISA.

In the for-profit private sector, there are a comparatively small number of data base producers, mainly in the UK, such as Derwent, Geosystems and IRL. There is a greater number of for-profit producers of source data bases, such as Datastream, Fintel, Reuters, International Business Information (Netherlands), and European Investment Research Bureau (Brussels).

Information industry in the USA and Europe

In general, the most notable difference between the 'information industry' in the USA and Europe is the variety and strength of the former compared with the latter. In both there are strong government services, an important non-profit sector and a for-profit sector. In general in both areas the non-profit sector comprises data base or data bank producers whose products are derived from previous conventional abstracting and indexing or data services. Thus the on-line revenue is currently a minor part of the total revenue derived from their producers.

It is in the strength of the commercial sectors that the two areas differ most noticeably. In data base production there is not the full range of European equivalents

of ABC-Clio Inc., Cambridge Scientific Abstracts, IFI/Plenum, University Microfilms, Capitol Services Inc. and Data Courier Inc. In data bank provision there is not the range of data banks provided by the large-scale banking and commercial institutions in the USA.

However the most notable differences are the virtual absence of private, for-profit organizations providing information or data from governmental sources, and the comparatively small number of organizations providing custom information services or acting as information brokers.

ACKNOWLEDGEMENTS

The concepts presented in this paper are derived from a wide variety of discussions and papers. Specific acknowledgement is made to a LINK Multiclient Study² which provided a very useful perspective, but the document most used is the paper, 'Commercially available data bases', presented by Alex Tomberg at a recent on-line conference in London.³ In that paper Tomberg quoted extensively from a EUSIDIC survey. Some of these tables and others provided separately by Tomberg⁴ are reproduced in this discussion paper.

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Identification of opportunities and some critical factors hampering further development

L. J. Anthony

Aslib

The paper enumerates the various influences which are either favourable or unfavourable to the growth of the information industry in Europe and analyses some of the more important factors. (It appears that, whereas the information industry must benefit from the general growth in the demand for information and from current developments in technology, there are a number of specific inhibiting factors, some of which do not admit of easy solutions. In some cases, factors which are unfavourable to one aspect of the industry may be favourable to another aspect, and although these may be enumerated separately the result is essentially a static picture of the situation, whereas what is really needed is a dynamic approach showing how the various factors are inter-related.) Failure to do this may produce unforeseen results: attempts to modify one factor, which may be reasonable when considered in isolation, may not have the desired effect because of dynamic interplay between factors in a complex situation

WHEREAS THE NEED for the present discussion derives from the development of EURONET and on-line services in Europe, the terms of reference for this paper define the scope of the information industry as including data base producers, spinners, publishers, information brokers, etc. If these terms are defined in a broad sense, much more than on-line searching is involved and this leads to difficulties in the categorization of relevant facts since a particular factor may be inimical to one aspect of information transfer, e.g. on-line searching, but favourable to another aspect, e.g. the use of printed publications. As far as possible attention is drawn to these variations in what follows. For a more comprehensive definition of the information industry see Appleyard's paper.¹

The provision of information services is not an end in itself. Information is merely a means by which other ends are attained: ends which may be technological, financial, political or sociological. No matter how much support, financial or otherwise, is provided for the industry, growth will be inhibited unless the products of the industry are closely geared to the needs of the users. This may appear obvious but needs to be said. It is considered further under usage below.

The situation is changing rapidly and it would be wrong to assume that future developments will necessarily continue along the same lines and that all that is needed is what already exists, but bigger and better. For example, the developments in on-line searching have created a swing away from local collections of information to centralized data banks, which may or may not be beneficial, but further technological developments could just as easily reverse the process.

Factors generally favourable to expansion**I. Growth of user population**

This factor is more complex than it appears at first sight because the word 'user' is capable of several different interpretations. From the point of view of purchasing power an important group is organizational users, i.e. organizations which employ people who may make use of information services regularly or from time to time and for which payment is usually made by the organization. These include industry, government, academic and other institutions, and public and national libraries

Taking industry as a typical example and using parameters such as Index of Gross Domestic Product (Industrial Activity), it appears that Western Europe (i.e. EEC and EFTA countries) is not particularly noted for rapid and sustained growth and lags some way behind Eastern Europe and developing countries (see Figure 1).

If one looks at the actual number of manufacturing units in the eleven countries of Western Europe for which figures are easily obtainable, there is, in fact, a steady

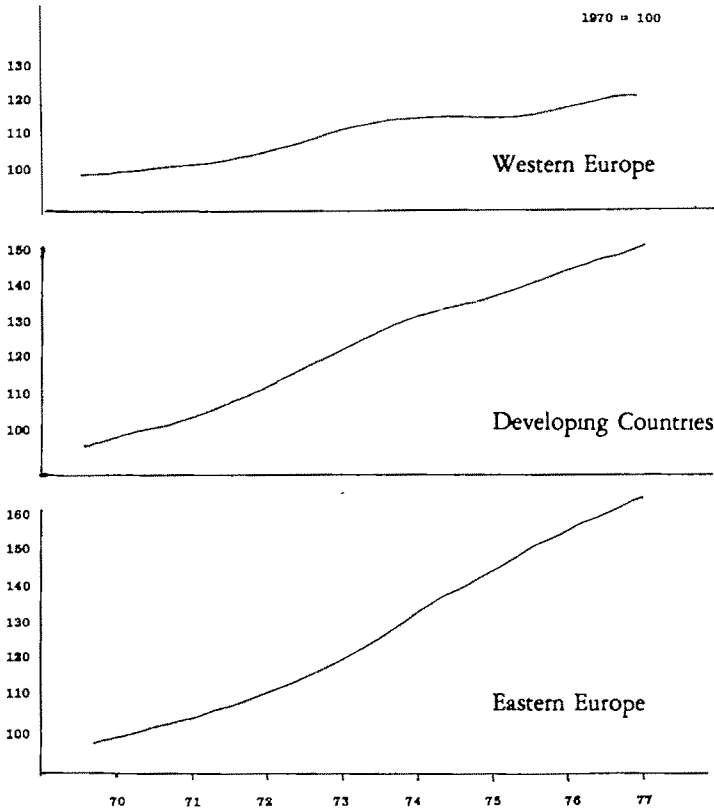


FIG. 1. *Index of Gross Domestic Product (Industrial Activity)*

decline in numbers (see Figure 2) against a fairly rapid increase elsewhere. This might suggest that the information industry should not lose sight of the market outside Europe and consider products which are closer to the user needs of non-European countries, e.g. publications and direct services rather than remote data bases.

On the other hand, although the total organizational population of Western Europe may not be growing significantly, the number of users of, for example, on-line systems, may grow in the short term until some kind of market saturation is reached or alternative systems are developed. One estimate¹ suggests that the number of searches

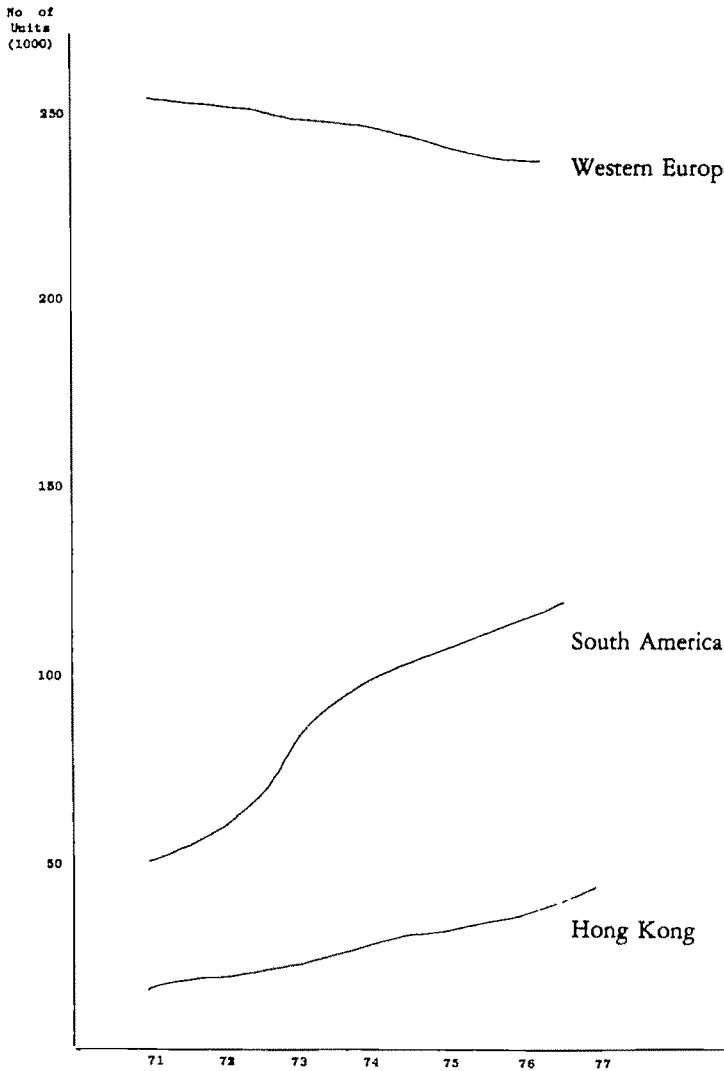
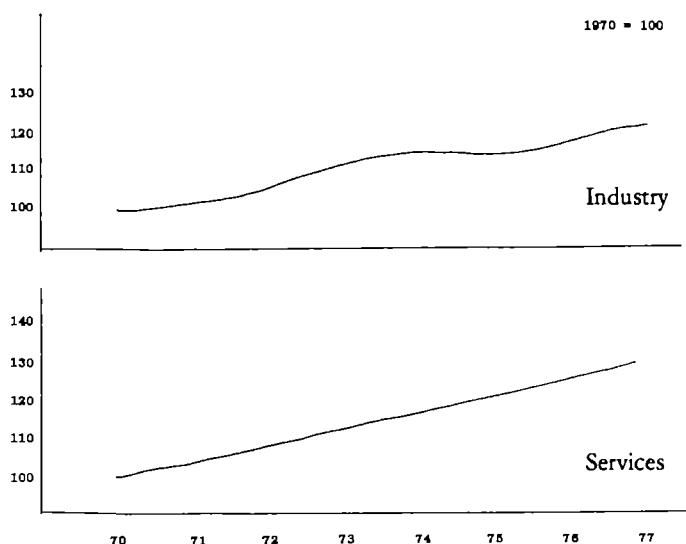


FIG. 2 Number of manufacturing units

FIG 3. *Index of Gross Domestic Product: Europe*

might rise to about one and a half million by 1982, representing possibly 20,000–30,000 users.

Outside manufacturing industry conditions may well be different. There is evidence of a consistent and fairly rapid growth in service industries (Figure 3), which, by their nature, should be large users of information. This particular aspect comes up again in what follows but it is suggested that a much more detailed analysis of these various user populations might be rewarding.

II. *Growth in the demand for information*

Despite what has been said above there are a number of factors which could lead to increasing demand for information services from the existing user population.

- The output of information itself is still increasing, particularly in non-technical areas such as government legislation, health and safety, standardization, social aspects of industrial activity, economic and commercial activities, etc. The EEC is no mean contributor to this avalanche although it has not been particularly successful in making it easy for people to make use of the information it produces.

- On the industrial side there has been an increasing change of emphasis in many Western European countries from pure and applied research on the one hand to product development, production, marketing, etc. on the other. Whereas research has always been well served by the traditional information services, product development and marketing have not and this has led to demands for more and different kinds of services. One very important aspect of innovation is the role of small and medium-sized industry and the development of information services which are attuned to their needs. There is, as yet, no general consensus on the nature of these needs although they are likely to be erratic and variable, and advisory as well as factual. Whereas the

main obstacles to innovation in large industry are probably financial, small firms will have additional problems in the technical and marketing areas especially relating to the export market—and in the UK, for example, small firms having less than fifty employees make up about 60 per cent of the total.² There is a lack of well-organized information about products and processes used by international competitors as well as about equipment and plant design, overseas market requirements and customer preferences. Whether these areas are suitable for the development of information data banks remains to be seen

- The change of emphasis from production of goods to the provision of services should lead to an increase in the demand for information, partly because service industries are labour-intensive and contain a high proportion of smaller units, both contributing to a growth in user population, and also because many of them are information-intensive in terms of information use per person employed. However, as in the case of small manufacturing industry, the kinds of services they need may be different from those now available.

- One feature of the last few years has been a significant increase in the demand for information from the ordinary citizen, for which there may be several reasons, among them an increase in the complexity of daily life, an increasing interest in the effects on peoples' lives of government and industrial activities, especially in regard to environmental problems, growth of higher education and particularly adult education; higher standards of living and so on. The 'right to know' is in the process of becoming accepted as one of the fundamental human rights and this one factor alone could add significantly to the volume of information being made available and to the demand for services by which it can be accessed.

III. *Technological developments*

The use of computerized text processing for the compilation and production of publications stimulated the development of machine-readable data bases, and the subsequent alliance with telecommunications led to remote access on-line searching. These developments have provided a capability for information to be made available:

- more rapidly,
- more comprehensively,
- more selectively, and
- to a wider public,

but not necessarily more cheaply or more reliably

In theory such developments should be of considerable advantage to all seekers of information and particularly to users in small and medium-sized organizations which do not have immediate local access to a wide range of bibliographical materials and data, and to organizations in remote locations, removed from large public collections of material. In practice the advantages are diluted by other factors, some of which will be considered later.

Viewdata and teletext services will provide opportunities for even domestic users to access remote data banks. At present these are limited in content and in use but the development of technology which would allow viewdata systems to be used interactively could lead to significant growth. Since, in many cases, the use of a

viewdata system might be a person's first contact with remote access information systems, viewdata could be a significant stimulus to the use of such systems elsewhere.

Factors generally unfavourable to expansion

I. *Environmental*

A. Legal and fiscal factors

- Information is a very uncertain product from a marketing point of view. It is true that man cannot live by bread alone but many can survive without information. The cost of setting up systems to provide information is high whether they be manual or mechanized, and the risks are considerable. One unfortunate feature of Western Europe in recent years is that risk capital is hard to come by. Institutional investors dominate the investment market and their cardinal rule is to play safe at all costs. One unfortunate consequence of this policy is that financial backing for individuals, as distinct from firms, has almost disappeared; yet the empirical evidence is overwhelming that wherever there is a successful innovation there is always an identifiable individual mainly responsible.

Simple government subsidy does not solve the problem since governments are likely to be just as cautious as financial institutions and would be inclined to back near certainties. (For example only well used and proven data bases are at present included in Info-line's repertoire.) In many cases in the past, injection of public funds has been regarded as a pump-priming operation for a limited period, the period often being too short to enable a state of viable operation to be attained. Such practices also introduce an element of what some people might regard as unfair competition which interferes with the stability of the system.

- One inhibiting factor to trans-border flows of information is the very great variation in legislation and in fiscal policy within the countries of Western Europe, even within the EEC itself. Taxation policies, for example the application of VAT and other taxes to elements of the information industry, vary widely. Whereas the idea of taxes on knowledge has been traditionally rejected in the UK and North America, it has been widely accepted in many European countries. It is true that the Commission is seeking to harmonize the position but there is no guarantee that the solution eventually arrived at will be the best answer to the problem.

The US Department of State Public Advisory Sub-Committee on International Data Flow has recently protested strongly because the US delegation to the OECD Drafting Group on Transborder Data Barriers and Protection of Privacy has 'accepted the inevitability of further unco-ordinated and disparate legislative efforts' in Europe, on the grounds that they will have a direct adverse impact upon the free flow of information across national boundaries, and, consequently, upon American businesses which operate multinational data processing and communication networks.³ If such a situation is adverse to American multinationals it must be equally adverse to European companies in the same field.

- Perhaps the biggest problem of all in this area is copyright, which has become a central issue in the information world and which can only be dealt with briefly in this report. In general, most countries permit the copying of single articles or extracts for the purposes of private use; the real problem arises in respect of multiple copying

for subsequent distribution, either freely or for sale. No acceptable solution has ever been found to the clash of interests between author and publisher on the one hand and intermediary and user on the other, and such agreements as the Berne Convention and the Universal Copyright Convention, which seemed reasonable approaches to the problem of protecting intellectual property rights when they were made, have been overtaken by the growth of a technology whose sole purpose seems to be to make it as easy as possible to infringe those rights

Within the international conventions there is considerable variation between the legislation of individual countries which is, itself, a barrier to an acceptable solution and creates all kinds of problems for the publishing industry as well as for users.⁴ A more detailed statement of current copyright problems will be found in Appendix A.

B. Economic factors

• It has been suggested that the existence of publicly-funded/subsidized services has had an inhibiting effect on the free market. Like most generalizations this one is not very meaningful as it stands; there is, for example, a great deal of difference between 'funded' and 'subsidized' and in practice there are a number of variations on both of them. It might be useful to consider the factors which create publicly-funded services in the first place, assuming for the sake of argument, that the ideal condition is a totally free market. These factors include:

- (i) There may be a lack of completeness in the range of services available and lack of co-ordination among them if left entirely to the market place.
- (ii) Commercial services, for financial reasons, tend to be carefully tailored to their target audiences and are therefore less easy to integrate into a national network
- (iii) The total information resources required by a country or community are unlikely to be just those that are financially viable.
- (iv) An important requirement of information services in many areas is continuity (or reliability) which can never be guaranteed under a totally free market. (Some might say that this could equally apply to government-funded systems—e.g. the demise of the ILO system in the UK.)
- (v) There are well-developed (and sometimes unique) government data bases which are an asset to the community and can be made available at market rates, thereby providing a return to the taxpayer on the public investment. A problem arises when changes in government policy lead to the selling off of such assets which can then be more competitive than commercially-developed bases because the development costs have already been paid for and do not need to be recovered.
- (vi) Growth of 'mission-oriented' activity, which implies a need for multidisciplinary information, often requires a more flexible approach than commercial services can provide.
- (vii) Government may sometimes perceive a body of users within its own 'control' for which it wishes to provide a subsidized service to encourage use (e.g. defence department contractors in the USA).

These are not the only criteria but they are, perhaps, the most relevant. The major

make it difficult for commercial suppliers to raise prices to the level which would problem is that government involvement in information in Europe is more concerned with 'dissemination' after the academic pattern, than with 'reception' as in industry, and has nearly always been associated with the development of low-priced services based on the idea that information has a social value which outweighs its market value. The result is to reduce the level of expectation of users to a low level and to enable them to invest in the development of much higher grade services at, of course, higher prices.

It is unrealistic to expect that there will not be areas of confrontation. The best safeguards are the development on the part of government of a coherent information policy, which includes a commitment to stimulating the industry and a re-examination of the idea of social benefit, and a strong information industry able to carry on a worthwhile dialogue with government.

- The previous remarks relate mainly to the development of information systems and do not apply to the telecommunications part of the activity where the position is quite different. In Europe there is no free market in telecommunications, and as the computer field and the telecommunications field get closer together there is every indication that the position will get worse rather than better.

It is possible that future generations might consider that the largest single factor inhibiting the exploitation of the new information technology in Europe, leading eventually to an almost complete dependence on the Americans in this field, is the monopoly status of PTTs. The Commission has accomplished a small miracle in persuading them to co-operate technically in the development of EURONET but seems to have had little success in harmonizing charging policies, equipment development or operating practice.

It is an accepted tenet of economics that no industry can be healthy without the constant establishment of businesses that are really new. The 'perennial gale of creative destruction' depends not on day-to-day competition but on the competition from the new technology, the new source of supply, the new organization which strikes at the very foundations of the existing enterprises. Without the Schumpeterian lever the only possible result is stagnation. The only effective deterrent against high prices is the fear of being undercut by a new company hungry for business. Managements are only spurred into activity to offer better levels of service by the fear that if they don't someone else will. A comparatively large fraction, perhaps 25 per cent, of the cost of information transfer over telecommunications links now goes to the PTTs and without competition of any kind this fraction is likely to get larger.

- The last factor to be considered under this heading is the nature of the market at which the industry is aiming. The market obviously depends on the distribution of information users and on their needs, as emphasized in the introduction, and a complete analysis of the market would need a considerably greater knowledge of user groupings and characteristics than is available at present. It simplifies matters considerably if two reasonable assumptions are made: first, that in the immediate future, at least, the majority of users of bibliographic data bases will be intermediaries; and second, that the majority of purchasers of information services will be corporate bodies of some kind or another.

Concentrating on the intermediary and the corporate user improves such factors as continuity, stability and coherence but still leaves a good deal of fragmentation. The

important factors contributing to the fragmentation of the market, in the European context, are:

	Possible number of factors
(i) Language	At least 6
(ii) Subject field	>100
(iii) Kind of information (i.e. bibliographic or data)	2
(iv) Category of recipient organization (i.e. industry, academic, government, etc.)	>6
(v) Nature of the activity (i.e. research, marketing, production, teaching, domestic, etc.)	>10

There are others but these five characteristics alone give a minimum of 72,000 specific markets which might be aimed at. A key problem for the information industry, in relation to growth, is coherence versus distinctiveness⁶ If individual services are not distinctive they will not develop market shares; if they are not coherent there will be no market to share. Coherence can be developed by operating on a European or even a world basis, rather than a purely national one, but there are still very great problems. There is little which can be done without factors (iv) and (v) above and individual services will have to make decisions as to who they wish to reach. The first three factors deserve further consideration.

(i) Language

The numbers of Western Europeans speaking the major EEC languages are roughly as follows:

	Millions
German	74
English	61
French	58
Italian	55
Dutch	17
Danish	5

which, in a European context, puts some kind of limit on the market for a data base in any particular language. It is true that many people *could* use data bases in languages other than their own, and, in fact do, from time to time, but since most seekers after information usually find more than enough to satisfy them in their own language, the stimulus to use other languages is not very great and the increase in the market that this might provide is probably marginal. The exception of course, is English, partly because of the present domination of the market by American data bases.

One question which must be asked in relation to on-line services aimed at world markets is, 'How important is the American market to the survival of the data base?' To enter the American market at all, the first requirement would seem to be an English language base, but, given that, can the base survive without some penetration of this market? When *Excerpta Medica* failed on its first attempt to gain a foothold in North America, further work on converting the base to machine-readable form was held up for some years.

It is pertinent in this connection to consider the present American view of the European market. There is already a strong feeling in North America⁶ that the pricing policies adopted by the European PTTs will result in American systems operators losing a significant portion, perhaps 25 per cent, of their European market and these fears are certainly not unfounded. The reaction may be more emotional than logical but it could have serious repercussions on the ability of European data base producers to sell their wares in America. There is a case for special effort by the Commission to undertake a public relations exercise in North America to ensure that American opinion is at least based on facts.

(ii) Subject fields

Data bases, published and on-line, are mainly of two kinds—disciplinary or mission-oriented. Disciplinary bases range from a very broad interpretation of the subject field (e.g. Chemical Abstracts) to a very narrow one (e.g. Mass Spectra) and mission-oriented bases usually cover an enormous range of subjects, but selectively. In science and technology there is considerable duplication (not necessarily a bad thing) and there are some gaps, although these are slowly being filled. The position at the moment is that there is probably a need for additional bases in such areas as mathematics, civil engineering and public health but future expansion in the number of bases is not likely to be very great.

On the other hand, in the non-technical fields, the scope for new data bases is very much greater. Whereas scientific information has world-wide relevance, information in the techno-commercial, business and legal fields is of more domestic interest and it is in this area, particularly, that Europe suffers in comparison with America. Much the same could be said about the social sciences and the humanities.

There are a number of bases which have not yet been made available on-line. That there would be a significant on-line market for these products seems fairly certain, yet they do not appear. Clearly there are good reasons, some of which have already been suggested, and this would seem to be an area which would repay further study.

(iii) Kind of information

The assumption was made that, in the foreseeable future, the major customer for the bibliographic data base would be the intermediary. This however would be an unwarranted assumption in relation to hard data bases. They will certainly be used by intermediaries but it has been suggested that their main appeal will be to the 'ultimate user', and it is in this area that the biggest increase in use is foreseen although, for many reasons, the picture is still cloudy. Many potential bases in the commercial, business and legal fields would be neither bibliographic nor hard data but something in between, and some experiments which have been undertaken to encourage senior executives to use these kinds of bases directly have not been very successful.⁷ The reasons for this are closely bound up with the traditional roles which managers believe to be appropriate to their function and are related to psychological problems of information transfer. They are discussed further below under 'Usage'.

II *Intrinsic*

There have always been factors which introduce a certain amount of negative feedback into the information transfer process, thus ensuring that the total system remains

finite and controllable. A typical example is the limitation on the human capacity for absorbing information.

In the particular case of remote access computerized information systems there are additional factors, not related to the environment, but implicit in the system, which might be considered inhibiting; these are set out briefly below

A. Mainly economic factors

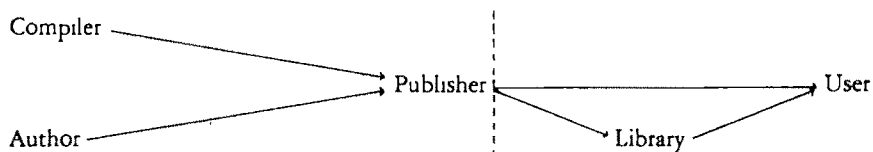
• Mention has already been made of the fact that very few of the existing on-line bibliographic data bases are financially self-supporting and that the majority depend for their continuation on the income derived from the published versions of the bases. On the other hand many hard data bases exist independently of publications and, presumably, make ends meet

The total number of enquiries answered by on-line searches is still only a very small fraction of the total number answered from all sources and there is, as yet, no evidence of wholesale cancellation of publication in favour of on-line access. Yet, in any particular organization and for any particular data base there must come a time when a choice of some kind has to be made. Among the factors to be considered in making this choice are

- (i) comparative costs of searching
- (ii) cost of storage space for publications
- (iii) period covered by data base in published version and on-line version
- (iv) differences in content between the two versions
- (v) frequency of use
- (vi) comparative ease of use
- (vii) nature of the inquiry normally put to the base—is it many-faceted or comparatively straightforward?
- (viii) ease of availability outside the local organization

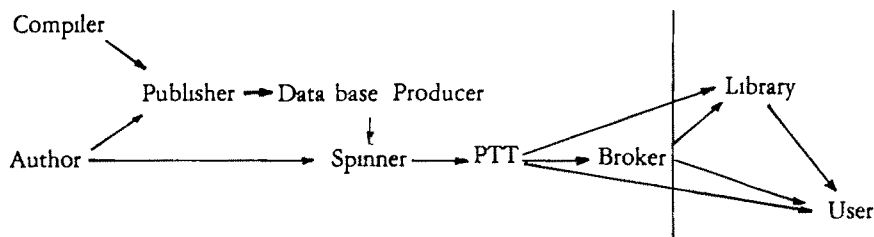
At present there is very little reliable information about many of these factors in relation to the distribution of bases and systems and this would seem to be an area in which useful studies could be undertaken.

• There are a number of links in the information supply industry, from originator to user, and it has been suggested that the growth of every segment of this chain should be encouraged as a desirable objective. Unfortunately the user may not see it this way at all. The traditional method of disseminating information is reasonably direct, the normal chain being.



in which the funds made available by those to the right of the dotted line supported the producers to the left of the line.

The on-line chain is much longer.



The funds provided by those to the right of the line (which are unlikely to be very much greater than those available for supporting the traditional chain) now have to support six different agencies rather than two. It is difficult to quantify this comparison at present but this might be an area worthy of study. Such a structure is inherently unstable—it conflicts with the principle of Occam's Razor—and could be justified only if there is real value added at each stage. There may well be an attempt to provide more stable alternatives: for example, a reversion to the more traditional chain but without its disadvantages, by using compact, high density, machine-readable storage media in place of printed publications which can be purchased outright by the user organization and exploited interactively via microprocessors.

- The last factor under this heading relates to the problems of actually getting a data base into machine-readable form for on-line use. There are two major aspects of this—cost and conversion.

Reference has already been made to the reluctance of some publishers to put large sums of money into machine conversion if a computerized printing system is not being used. The cost is high and the returns difficult to estimate, whether the publisher undertakes the job himself or contracts out to an existing data base producer. However if the nature of the publication is such that computerized production would either reduce costs or improve the product, there is always the possibility of licencing an external agency, possibly a data base producer, to market the machine-readable version.

A much more inhibiting factor than cost lies in the difficulties which always seem to be associated with conversion of a published base to machine-readable form. Delays in publication of twelve months or more are not uncommon. Very often the reasons are connected with lack of understanding, by the base compilers, of computerized systems and their limitations, and equal lack of understanding of the objectives of the data base by data base producers.

There is at present no central agency which can be used by publishers to get help and advice on conversion and the many problems involved, or on the selection of suitable organizations to handle the conversion.

B Usage factors

- There have been many studies of user characteristics and needs and the main lesson to be learned from them is that the needs of any particular user at any particular time are completely unpredictable. The only helpful way of studying use is through statistical distributions based on information acquired through surveys. The most

common phenomenon is that, for any particular group of users of a particular service, the distribution of use usually follows a negative exponential form, in which there is always a long tail of users who make zero use of the service

The factors which are known to affect usage include those set out below. Some of these affect the decision whether to use or not (U), others affect the volume of use once the decision is made (V); some, of course, affect both. In addition some of these factors relate to decision-making by intermediary or user (I); others to decisions by management (M).

- (i) Knowledge that any information service of potential relevance exists. (U) (I)
- (ii) Relevance of the service to user needs at a particular time (U) (I)
Once proved to be relevant, use will probably continue until either the need changes or the service itself changes in some way.
- (iii) Ease of access to the service. (U & V) (I & M)
The ease with which initial access can be obtained (particularly important in on-line services) affects the decision to use and, continuing ease of access affects the volume.
- (iv) Ease of use. (V) (I)
Given a choice most people will prefer the simple and straightforward rather than the difficult and complex.
- (v) Cost of initial entry (U) (M)
The costs to be considered include purchase of equipment; entry fees; initial staff costs; training costs, etc. There may be hidden costs, e.g. if the attempt to use the new service subsequently fails there would be a cost associated with re-establishing the alternative service which, perhaps, was discarded on entry to the new service
- (vi) Operating costs. (V) (I & M)
These include search costs; staff costs, maintenance costs; establishment costs, administration costs, telecommunication costs, auxiliary costs (e.g. manuals etc.).
- (vii) Ease by which results of use of service can be implemented. (V) (I & M)
Having acquired a list of references is it easy to acquire the documents or original information? How useful is the information, in the form in which the service provides it to the user or organization? Can it easily be incorporated in the local information store?
- (viii) Skill of user or intermediary. (U & V) (I)
How much training is required to become proficient? What background qualifications are required? How much use of the system is necessary over a period in order to maintain proficiency? How easy is it to obtain training? What kind of training is needed and at what level?
- (ix) Keeping up with the Jones's. (U & V) (I & M)
People are more easily persuaded to use a service if it appears that everyone else is using it.

- Actions which would tend to make these factors less inhibiting include:

Publicity, demonstrations at exhibitions, public relations exercises, market studies, etc. (Factors i, ii and ix.)

Greater use of information services by national and international agencies. (Factors vi—since greater usage is itself a factor in reducing costs—and ix.)

Sympathetic legislation and tax policies (Factors v and vi.)

Rational training programmes aimed at the user's need, not the producer's convenience (e.g. courses which cover searches in particular disciplines but over a wide range of data bases and systems). (Factors vii and viii.)

Removal of barriers to use. These include complex pricing policies; high telecommunication costs; restrictive initial contracts; copyright; unhelpful software; long recognition codes; limited times of access, lack of standardization; restrictive practices in the installation and maintenance of equipment, etc. (Factors iii through vii)

Encouraging the use of information at all stages of the educational process—primary, secondary and higher (Factors i, viii and ix.)

Providing services more nearly attuned to the needs of users (Factors ii and vii.)

- User reaction to information services is another factor. Many strategies for the development of information services are based on the assumption that 'users' are avidly awaiting the advent of more and better tools to enable them to obtain access to ever greater quantities of information. This is hardly consistent with experience since the majority of researchers and decision makers seem to be looking for ways of reducing their information input rather than increasing it.

The development of new services, often with unique and complex search methodologies, does nothing for these individuals except increase their anxiety. This applies just as much to hard data bases as to bibliographical data bases. There are still many members of the human race who don't wish to be confused by facts! Nevertheless they still have problems and they still require answers to these problems.

If it is recognized (and this is supported by all the available evidence) that the real users of information services are intermediaries, then it follows that information services should be designed for these people and in such a way that the intermediaries can produce what the ultimate users really require—not 'information' but relevant answers. This implies an ability to collect, correlate, analyse and digest information and reproduce it in a usable form, which suggests that money spent in teaching intermediaries how to do this would be far more effective in achieving the original industrial, sociological or technological aims, than money spent teaching researchers and executives to manipulate on-line terminals

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APPENDIX A *Copyright*

The two current attempts at reconciliation of the opposing interests are the *transactional* approach and the *licencing* approach. The best example of the former is the Copyright Clearance Center in the USA. In this system the copying organization registers with and reports to the Center the amount of copying done beyond that permitted by the US Copyright Act and pays to the Center such fees as are required by each publisher whose work is copied. The Center takes a handling charge and passes the residue to the publisher. The weakness in this system is that it cannot be enforced. If the copying organization does not register or report, no payment is made. The alternative is the licencing system in which the copying organization has to hold a licence, which must be paid for, before copying can legally take place. The amount of payment is the subject of continuing negotiation between copyright owners and users and the owners receive payment ultimately on some form of sampling basis.

In the information field, discussion focuses on two main areas. The first is the inclusion of bibliographic entries or abstracts of published material in bibliographical data bases, particularly machine-readable bases; the second is the provision of copies of original texts as a result of information searches. The first of these has never received explicit treatment in copyright legislation—for example it is mentioned, but not resolved, in the US General Revision of Copyright Law 1976 and it is treated in rather vague terms in the Whitford Report on Copyright. Up to now it has not been a major problem since it has always been possible to make amicable arrangements of one kind or another (see, for example, the NBS report on Copyright in Computer-readable Works¹). However, the problem becomes much more severe when considering hard data bases which include transcripts of original text, witness the problems encountered by Derwent in attempting to set up a Chemical Business Data Service because of copyright difficulties with publishers. Of course, it might be questioned whether this really is a copyright problem or just a failure of competing interests to agree on a method of exploitation *within* the framework of copyright. It should be possible, given goodwill on both sides, to solve this kind of problem through the mechanism of a licensing system.

Another aspect of the problem occurs when on-line searches are carried out by an intermediary or broker and made available to a third party for payment. In some ways this problem is analogous to that of Public Lending Right. Does the activity of the intermediary enhance or restrict the market for the original service? Middlemen are a traditional feature of the marketing scene and brokers perform a useful function in introducing many people to on-line searching. In any case does it really matter to the data base producer who does the search so long as his system is used?

The second feature of copyright which has been the subject of much acrimony between publishers and information users is that of providing copies of full texts. It has been suggested that indiscriminate copying by libraries and others has resulted in significant loss of income by publishers but a recent study carried out by Aslib² suggests that there is no real evidence for this. The Commission of the European Communities has recently commissioned a study³ in the area of hard copy supply in support of on-line searching systems, which makes certain proposals to deal with both the short-term and the long-term problem, based mainly on the introduction of a licensing system.

The major difficulty with both transactional and licensing systems of dealing with the copyright problems is that they involve the setting up of fairly complex mechanisms, the administration costs of which are likely to absorb much of the income from the system leaving comparatively insignificant amounts to compensate the copyright owners. It is possible that a complete re-thinking of the whole program will be necessary before an adequate solution is found.

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Some conditions for successful commercial information operations

D. H. Barlow

INSPEC

Previous papers have reviewed the opportunities and problems that face the information industry on an overall industry basis. At the level of individual organizations faced with decisions whether to embark on development of a data base project, a host of difficult and inter-related decisions have to be taken. Just what some of these decisions are is portrayed in a short three-act scenario showing the factors that could influence an organization. While the scenes are completely fictitious, nevertheless analysis of the principles involved reveals twelve basic criteria that should be observed in setting up a data base.

IN THE PRECEDING papers much has been said about possible opportunities and adverse factors that may stimulate or hamper the development of a European information industry. Broadly, the opportunities can be seen as:

- a large potential market,
- the provision of a EURONET carrier system to permit transmission of information;
- a number of unique European-produced data bases

Against this set of opportunities which make for a favourable climate must be ranged the adverse factors which could hamper the industry's development. These include

- lack of homogeneity in the industry,
- multiplicity of languages;
- lack of entrepreneurial spirit coupled with governmental intervention,
- copyright uncertainties;
- lack of 'freedom of information' as in the US;
- lack of computer exposure;
- lack of appreciation of the value of information, as much of it is free.

This workshop is aimed at trying to remove some of these barriers, and among some suggested solutions that have been advanced are:

- subsidies to assist initial investments;
 - provision of phased contributions towards operating expenses;
 - guarantees to attract venture capital;
 - export incentives and guarantees for minimum sales
- All of these measures are aimed at an industry level.

This paper examines via a three-act scenario some of the actual problems that face a data base producer. It projects a fictitious numerical case of the cost of setting up a data base. (While the example is fictitious nevertheless the orders of magnitude of investment are approximately correct, based on investigations performed within INSPEC.) From an analysis of the scenario a number of principles emerge which can be taken as basic requirements to be implemented if a commercial environment is to be created in which data base producers can operate freely.

The principles do not differ from those that prevail in any successful commercial environment. They revolve around:

- finding an opportunity;
- availability of capital,
- adequate product design;
- knowledge of competition, both real and potential;
- aggressive marketing;
- adequate production resources.

'Setting up a data base'

or

'Pitfalls to watch for'

A three-act scenario with the following characters

WIDGET PUBLISHING COMPANY A small successful publishing company with 200 employees producing a range of technical books, and one small data base *Widget Abstracts*
(WPC)

A GRESSIVE

Chairman, WPC

S ALES

Marketing Manager, WPC

D MARK

Financial Director, WPC

M PROCESSOR

Technical Manager, WPC /

Act 1—Setting basic criteria

Scene WPC Boardroom; time, now.

At the Board Meeting of Widget Publishing Co., the Board are reviewing forward strategy. WPC has been very successful recently and the Chairman, Mr A. Gressive, is comparing WPC's performance with that of the publishing industry as a whole, as analysed in some Inter-Company Comparison studies. WPC's return on capital exceeded the ICC publishing industry 1976/77 ratio of 29.8 per cent by 1.3 per cent and its return on sales was equal to that of the industry average of 9.6 per cent.

CHAIRMAN We have done well, and certainly *Widget Abstracts* is growing nicely. I think we must expand this data base operation. My friends at the EEC tell me it is the growing industry. What do you think Mr Ales?

MARKETING Yes, the whole industry is at a change point. In fact it isn't an industry yet. What is happening is that Europe is just waking up to data bases. There could be opportunities for us but there are risks. It is difficult to identify real market sectors that we could attack

- FINANCE Yes, it is risky. It is a very volume-sensitive business; we can invest \$100,000 in setting up and not be sure of our returns. There are very high front-end costs in setting up. It also depends if we go for printed abstract publications or an on-line service or both. Our cash flow is eased if there is a printed publication since the annual subscriptions reduce our working capital requirements.
- TECHNICAL I agree with Mr Ales that there are technical opportunities, the whole scene is changing, and we must try to match American activity technically. EURONET will help. The advent of teletext and microprocessors will open up new possibilities.
- MARKETING We must think on a world scale. I feel that there ought to be something for us in entering the data base business.
- CHAIRMAN We are agreed—let's investigate. But if we are going ahead the criteria that any product or service must meet are:
- discounted cash flow return on capital, 15 per cent over five years—after all, this is a risky business,
- return on sales 15 per cent on turnover.
- If we aim for these we should be all right. Mr Ales, will you make a report at the next Board, please?

Act II—The market problem

One month later.

- CHAIRMAN Now, Mr Ales, what have you got for us on the data base problem?
- MARKETING Well, Mr Chairman, I have only looked at the market side and the product. I have not talked to Finance or Technical on the costs of production or how we could produce it.
- The first thing that happened when I started looking for gaps in the data base situation was a feeling of impossibility. With the figures from EUSIDIC I found that there were 556 European bibliographic files and 609 data banks. And it appears that in Europe data banks are growing faster. Then there are other trends—covering technology, economics, etc. A further trend is a shift in bibliographic file production on specialized subjects from the USA to Europe.
- Having examined all this, I came to the conclusion that desk study would not find the gap I was hoping for. Already there is a proliferation of data bases. In my view the only way to locate a candidate area was to visit a number of research organizations and talk to them to see if there were any clues as to information they wanted. In fact it was just like locating a book manuscript except the investment is bigger. In my search I concentrated on data since it was clear that the bibliographic coverage of literature was well catered for. Another reason for a data approach was that users appeared to pay more.
- In one of my visits I located a subject GNOF which is a growing substance in the chemical field and which has a lot of data (thirty-five

fields) associated with it. My recommendation is that we concentrate our thoughts on a data bank for GNOF.

CHAIRMAN: Will it be on-line or printed, and what is the market?

MARKETING: I think at first it should be only on-line and could be backed by an annual cumulation of data. As for the market, in Europe it is likely to be small (about 200 firms) and a similar number in the USA—in all, 500 firms. As for what they could pay, there is no hard evidence; all we can do is to go on similar services. There seems to be a level of, say, \$4–5,000 per annum unless one is into hard commercial information where it can soar to \$10,000 per annum or more.

Incidentally, I discarded commercial/econometric data bases due to the high investment cost and also copyright uncertainty.

My projection is a universe of 500 with an average of, say, \$2,000 per annum. A turnover of \$1 million. This equates, if one is working on-line only, to each user using eight hours per month if the connect-hour charge is \$60 per hour and our royalty 30 per cent.

In summary I think there is a product that could generate \$1 million turnover eventually but only as an on-line version initially though a printed cumulation could top 1,000 copies at, say, \$75 each.

The number of items would seem to be 200 substances each with thirty-five fields plus a narrative description. But I think that Mr Processor has something to add.

TECHNICAL: Yes. Talking yesterday to government people I heard that there is an all-university research centre scheme for chemical data banks to be launched. If so, this could cut across what Mr Ales proposes.

MARKETING: Yes, indeed; it is vital that we are not pre-empted by government or state funds. If there is state funding then we should look elsewhere for our product.

CHAIRMAN: Can we get state funding?

MARKETING: Unlikely, and anyway it will slow up operations.

CHAIRMAN: Still, we should look at it.

Well, gentlemen, we have a possible product. Now let's look at what it will cost and how the whole project looks financially. Mr Mark, will you prepare this for the next Board?

Act III—The decision

One month later.

CHAIRMAN: Today we must decide on the GNOF project. Is it a venture we proceed with or not? Mr Mark.

FINANCE: Mr Processor and I have had a look at the production costs and I have reviewed the overall situation.

To produce the data base we identified the following cost areas:

data acquisition;

data analysis;

entry into computer system;

production of tapes for on-line loading;
salaries;
overheads;
development costs.

We assumed that we would not have to bear any loading of the data bank onto the on-line system. We looked at whether we should buy an American production system or develop our own. If we developed our own we might get some government support but the details of the support are not clear so we have discarded this temporarily and are doing the development ourselves. It would have been useful if there were a review of technical systems and clear guidelines of support.

The costs look like this.

Development of system: (including testing)

Technical 1½ man years	\$50,000
Editorial 1½ man years	\$30,000
	\$80,000

Operating costs:

A team of four including \$150,000 per annum rising by 10
overheads, computer time, per cent extra cost per annum
marketing, etc.

I could not find details about tax relief on this type of development nor on VAT position.

So assuming a build up of Mr Ales' customers as below on the basis of 50 per cent penetration of his universe of 500 customers

	Year 0	1	2	3	4	5
Customers	—	50	100	150	200	250
				<i>Profit/Loss \$000s</i>		
Income @						
\$2000 each		100	200	300	400	500
Expenditure	(80)	150	165	181.5	200	210
Profit/Loss	(80)	(50)	35	118.5	200	290

These figures show the vulnerability of the operation. There is a high set up cost but equally high profits thereafter

Then we looked at the risk potential and it is worrying. If sales targets in later years fell by 20 per cent and costs increased by 20 per cent the picture would then be.

	Year 0	1	2	3	4	5
			<i>Profit/Loss \$000s</i>			
Royalty	—	100	200	240	320	400
Expenditure	(80)	180	216	259	310	372
Profit/Loss	(80)	(80)	(16)	(19)	10	28

Our bankers felt that this was something they would not touch, as it was too sensitive to cost variations, technology changes and market uncertainties. Also there were no tangible assets to secure the investment

I couldn't find any venture capital unit that liked it; those that even looked at it wanted very high equity stakes.

So to summarize, if we achieve a 50 per cent penetration in five years of a very limited market, we are fine. Profit on sales is 58 per cent and the DCF return is well in excess of 24 per cent.

But—and it is a big 'but'—if costs increase by 20 per cent each year and we don't penetrate the market, we at the end of five years are earning 7 per cent profit on sales and have a negative cumulated investment of \$157,000. Mr Chairman, unless we can get some support it is too risky financially though there may be other factors.

CHAIRMAN: Mr Mark has put the situation very clearly. If we meet market forecasts we will be all right. There is nothing new in this, entering a new field is always a gamble. From what I have heard it is a field we should be in and I hear that the field itself is forming associations so we may get better market information in the future. There is also the idea of a co-operative venture with other organizations and there is talk about investment grants from the EEC.

Gentlemen, on the facts, although it is risky I think we should go ahead on authorizing development and report to the Board in nine months with further market facts and opinions.

Analysis of the scenario

From analysis of the practical approach that Boards and Governing Bodies adopt in choosing new directions in the information field guiding principles emerge, the first two from Act I, the next five from Act II, and the last five from Act III.

1. Data base production is risky. High returns on capital are required to offset risk
2. Risk is due to high front-end costs in setting up and the difficulty, if not impossibility, of estimating market usage. There is need for audited overall-usage or user-identification figures on which better market analysis can be based. Cash flow is helped by printed publications.
3. There is a proliferation of data bases. New ones are likely to be found only by close contact with users. Traditional opportunity-location techniques must be used, i.e. discovering one is sitting on an opportunity, projecting forward patterns, or conceiving a project from background knowledge.

4. New data bases will be a trade-off among need, commercial return and strengths of the organization. (Note that WPC discarded commercial data bases as too high an investment.)
5. Copyright uncertainty was also a factor that inhibited WPC's growth into commercial information.
6. In the data bank area a trade-off between printed products and on-line will occur.
7. It is vital that any government plans are well known to the industry so as to minimize wastage of time and effort. There should be no governmental subsidized services which could either inhibit private development or cause unfair competition by disturbing the market.
8. To help producers, a technical review of data base production systems, indicating those that were available for purchase, would be useful
9. As data base production is a new industry without any history of support, it is essential that details of any government support schemes are widely disseminated.
10. Obviously WPC would welcome tax or VAT relief schemes. Also since much of the market was overseas, export or overseas promotion incentives would be something Mr Ales would look for.
11. Venture capital in the information industry will be difficult due to the high risk which will in turn mean demands for large equity stakes. Other approaches such as guarantees may be needed.
12. To reduce the risk more market data is needed. Ideally an industry list of potential purchasers is one idea; industry-audited data on on-line penetration, usage and other statistics would be helpful to all.

Conclusion

From this elementary fable of WPC's deliberations on whether to expand their data base operations, an attempt has been made to set down some basic principles or criteria that influence the thinking of organizations in their decision to proceed or not. The twelve themes would, if positive action were taken on them, create a highly favourable climate for the generation of data bases and, consequently, help European exports and speed innovation. Conversely, failure to remove restrictions would stultify growth and leave exploitation of the field to others. It is hoped that the identification of these principles will spark off fruitful discussion, and identify others that have been omitted

Possible means of stimulating investment in and improving the climate for the information industry: strategies for EEC intervention in the European information industry and market, 1981-85

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Section I raises four basic strategic questions, which must be answered before one can formulate appropriate intervention policies: What are the underlying objectives of intervention? Should the main stress be on developing the market or the industry? Should the scope still be mainly limited to on-line information, or should it include all useful information? What should be the level of EEC intervention? Section II suggests some of the arguments one might use in trying to answer them, in terms of the benefits and costs of alternative strategies. Section III concludes that answers must be agreed to the four basic questions before meaningful implementation plans can be developed. Answers to the questions can only be agreed through further debate and further study. Appendix A gives the author's view of the outlines of an appropriate strategy. Appendices B and C are notes on data base opportunities, and specific policy options for the EEC. At this stage, discussion of tactics should be limited to ensuring that any proposed strategy is tactically feasible. Detailed tactical planning should await the agreement of a strategy

I. Four basic questions

THIS PAPER AIMS to help formulate EEC intervention policies in the information field. Four basic questions must be answered before appropriate policies can be developed.

- (i) What are the *underlying objectives* of intervention?
- (ii) Should the main stress be on developing *the market or the industry*?
- (iii) Should the scope still be mainly limited to *on-line information*?
- (iv) What should be the *level of EEC intervention*?

It is recognized that, in practice, the Commission must be pragmatic: opportunities must be taken as they arise. But there is still the need for an overall strategy. What that strategy should be depends on the answers given to these four basic questions.

In deciding which strategy to adopt, we need to explore a number of choices including that of not intervening at all. In each case we should decide roughly what we think will happen, and especially in what ways the outcome of each strategy will



differ from the outcomes of other strategies. The point is that it is important to consider more than one strategy. Questions (ii)-(iv) explore the range of available strategies, in terms of the focus, scope and level of possible EEC intervention. But, in order to choose a strategy, we also need decision criteria. These depend on what it is we are trying to achieve.

Underlying objectives

The underlying objectives of intervention are by no means self evident. One reason for this is that so many benefits might be cited: less dependence on the USA, more industrial innovation; better balance of payments; faster growth in the 'Télématique' sector; more jobs; easier access for small firms and the general public; economic integration; support for EEC regional, agricultural, and environmental policies, reduced language barriers, better relations with less-developed countries, and so on. Other benefits might include increased profits (and taxes) in the information industry, and increased traffic for EURONET.

We have many possible objectives, and they are inter-related (in some cases, perhaps negatively inter-related). But which are the most important underlying ones? The answer to this question is fundamental to deciding which strategy to adopt.

For instance, if the main aim is to reduce American dominance, the priority should be to develop the European information industry, rather than opening up the European market: if the main aim is to foster EEC industrial innovation, the priorities are reversed. So the question of objectives is fundamental. The answer leads to the second basic question.

Information market or information industry

It is important to distinguish two related areas for intervention, the information market and the information industry.

European information market: the use of information by Europeans (individuals and organizations). The information may be supplied by non-Europeans.

European information industry: the production and distribution of information by Europeans. The information may be sold outside Europe—the market is a world market.

Policies aimed at stimulating the European market will also tend to help the European industry, and vice versa. But with limited EEC resources, there is a fundamental policy issue as to whether the main priority should be market development or industry development. (This priority need not be constant through time. For instance, one strategy might be to focus initially on strengthening the competitiveness of the EEC information industry, and only then making a major effort to open up the market.) There is a trade-off between the benefits of wider and more efficient industrial use of information produced in Europe. Where we stand in 1985 will depend greatly on the priorities we set now.

The question of focus leads to the question of scope. That is, the decision as to whether EEC policy should be market- or production-oriented will also influence the extent to which the policy should be limited to on-line information, or broadened to have a wider scope. This is the third basic question.

On-line information or all useful information

EURONET is a major undertaking, and its initiation was a notable achievement by the Commission. Given the importance of EURONET, it is hardly surprising that EEC information policies have been strongly orientated towards on-line technology—specifically, towards remote data bases on host computers, accessed on-line via EURONET by users with non-intelligent terminals. (In principle, EURONET's aims are wider than this, but in practice, the emphasis has been on-line.)

The question arises as to whether the scope of EEC policy should now be broadened to include other technologies: older technologies (print, batch, microform) and newer ones (teletext, viewdata, microprocessors, videodiscs). While some of these technologies imply the same policies as those developed to encourage on-line retrieval, others imply quite different—even conflicting—policies. In particular, new media for cheap, high-density, read-only storage may render the on-line distribution chain (host plus network) obsolete by the 1990s, except for infrequent, *ad hoc* information requests.

The question of scope becomes even more important if the priority is placed on market development, rather than industry development. The end-user is concerned with the usefulness and availability of information, not with who compiled it, or how it has been stored, retrieved or transmitted. Indeed, much of the information so used comes from informal sources, especially from face-to-face and telephone conversations, and from the user's personal experience.

This paper concentrates on policies from commercially-available on-line information, as implied in the initial brief. But, in the author's view, future EEC policy should be defined much more broadly. The last strategic question is how much the EEC should intervene.

The level of EEC intervention

One measure of EEC intervention is in terms of expenditure—perhaps broken down into current and capital expenditure. But in discussing strategy, it is useful first to distinguish three qualitatively-different levels of intervention:

Minimal intervention: i.e. leaving things to market forces. The attractions of this strategy are that it involves no expenditure of public funds, and it gives rise to none of the hidden costs of intervention, discussed later. As a general statement, the conscious decision to do nothing is in the author's view the most underestimated strategy available to policy-makers. In fact it is rarely even discussed, because of the psychological and organizational need to take action even if doing nothing would get one closer to one's objectives. Empirically, the quality of decision-making seems to be better if the decision-maker has a clear idea of the base case, i.e. what would happen if he did nothing.

An important variant of the minimal intervention strategy would be to announce that the Commission was not going to intervene in this field for a period of at least five years. This would eliminate an important element of uncertainty from the viewpoint of the industry.

EEC as a catalyst: i.e. the removal of barriers and market imperfections. The main aim here would be the provision of general support so as to accelerate the development of the market and/or industry. Policies might include promotional

and other activities to stimulate use, removal of legal barriers, market research, marketing or technical advisory services, infrastructure development, increased use by the EEC itself, and so on. Especially cost-effective might be those policies which reduced uncertainty, thereby causing developments to occur sooner. Again, one way in which this could be done would be by giving maximum notice of any planned intervention—or non-intervention—by the EEC or its member state governments

EEC as a source of funds: i.e. direct financial subsidies. Such support would be expensive, and would raise deep issues of determining which projects should qualify, in principle and in practice. The justification for direct financial support would be that the market mechanism fails to take account of the social or indirect benefits of some projects. This issue is discussed in detail in the following section.

The level of EEC intervention need not be uniform across the board. It may be best to intervene at a low level in some areas, and a higher level in others.

In this section, it has been suggested that four basic questions must be answered before appropriate policies can be formulated. The first, most fundamental, question is, what are the underlying objectives of intervention? The other three questions reflect the need to consider more than one possible strategy; they ask what should be the focus, scope, and level of EEC intervention.

The next section discusses some of the benefits and costs of various strategies. This discussion is inherently subjective—it reflects the author's views of how one might set about answering the four basic questions. Readers may disagree with the author's cost-benefit analysis, while agreeing that answers must still be found to the basic questions.

II. Benefits and costs

We now discuss the benefits of developing the information market, the benefits of developing the information industry (broken down into production and distribution), and the costs of EEC intervention.

Benefits of developing the market

What would be the benefits of making more information available on-line within Europe, and of promoting it, so that it was used?

The main benefit would be to help *industrial innovation*. We still know surprisingly little about the value of information to businessmen, but the following generalizations seem to apply:

- (i) Businessmen make frequent use of internal information (costs, sales, etc.) for steady-state control purposes.
- (ii) They make less frequent use of information about the outside world, but the value of such information tends to be more strategic, i.e. it tells them about longer-term threats and opportunities.
- (iii) Outside information has an especially important role in initiating innovation. The first stimulus for change usually comes from outside the firm.

- (iv) Successful innovation involves the matching of a new or existing market need with new or existing technology. The stimulus may come from the market, the technology, or sometimes from the firm itself actively seeking opportunities. About 60 per cent of *successful* innovations are due to market stimuli.
- (v) Most sources of 'current awareness' are informal newspapers, trade gossip, suppliers' salesmen, etc. These sources tell the businessmen of new threats and opportunities. It is not obvious that on-line technology can be used in the near future to improve this process much.
- (vi) Once a new (technical or market) opportunity has been spotted, the businessman searches for an existing (market or technical) means of exploiting it. This may involve the use of outside information. *It is here—searching for a way of exploiting a new opportunity—that on-line technology seems to have most to offer, especially if boosted by customized information services*

The process of innovation is of central importance to EEC information policy. Not only does it provide the main rationale for market development, it also gives the key to development of the information industry itself: the same factors apply to this industry as to others.¹⁻³

So the main benefit of developing the availability and use of on-line information lies in the encouragement of industrial innovation.

In the case of the EEC, there are two other special benefits.

The EEC is still not a common market in the sense that the USA is. One reason is the lack of standardized market data covering all member countries. The development of EEC-wide data bases would tend to encourage international trade within the community.

Faster market take-off would tend to generate more revenue for EURONET.

To summarize, if the use of on-line information in Europe is four or five years behind its use in the USA, and if the EEC can significantly reduce this gap by 1985, there should be important economic benefits, the main one being industrial innovation.

Such an improvement in the ability of European firms to innovate does not depend on who produces the new data bases. In particular, the data bases may be American-produced.

We now move on to the separate, but related, benefits of developing the European information industry. We first discuss production, then distribution.

Benefits of developing production

A European firm will produce a new data base (or publish an existing in-house one) if it expects to make a profit by doing so. If it succeeds, that profit will be of benefit to other Europeans, in the form of tax, investment, or expenditure. If it fails, its loss will also be felt elsewhere, in terms of reduced tax, etc. The market mechanism would therefore seem to be a good way of seeing that resources are allocated for the benefit of all. So what are the arguments for intervention? They fall under two headings, market imperfections, and externalities.

Market imperfections

These mostly relate to imperfect knowledge in the market-place

Left to its own devices, the firm may not see the opportunity.

It may see the opportunity, but have little idea of the likely return and risk.

It may have a well-informed assessment, but find the risk prohibitive. Or it may be unable to raise the money, because bankers do not know this industry, and do not like to invest in intangible assets.

It may lack some of the necessary resources, which could be supplied by other, complementary firms, if only they were operating in partnership.

It may be unable to reach its market, because of poor infrastructure. The important elements here are distribution (on-line service operators, telecommunications) and marketing (partly done by on-line operators, but also by customized information services, library and trade associations, etc.)

These and other market imperfections tend to lead to underinvestment. EEC intervention to reduce these imperfections can thus increase the benefit of a European information industry. The main intervention to date has been the setting-up of EURONET, which will be of great—if unquantifiable—benefit to the industry. (Although a free-market economist would argue that EURONET merely removes barriers originally put up by government intervention, i.e. the PTT's punitive tariffs on data communication.)

One important area for intervention lies in making European firms aware of the opportunities—the first step in innovation, in this industry as in others.

Externalities

Even with perfect knowledge in the market, there would be 'externalities'—costs and benefits resulting from market transactions, but felt by third parties. The case for spending large sums on direct subsidies of individual projects is based on such externalities, e.g.

Balance of payments, i.e. more exports and less imports. The benefit here is hard to quantify, but is proportional to revenue.

Multiplier effects, e.g. a new European data base will tend to generate business for European on-line operators, and for EURONET. At first glance, multiplier effects are very large—every extra dollar of data base revenue means \$2 to \$3 further down the line. But much of this will be outside Europe; most of the rest would apply equally to European use of a non-European data base, and the extra volume will generate costs as well as revenues, especially for the on-line operator. So the benefit is less than it might at first appear. Like the balance of payment effect, the multiplier effect is roughly proportional to use, i.e. revenue

'Technological balance of payments'. It is argued that the production of data bases in the EEC would tend to reduce technological dependence on the USA, and that this would be a good thing. But it is not clear why EEC production of data bases—as opposed to their use—should reduce technological dependence. Nor need such dependence hamper economic growth: the success of Japan has so far been based on the exploitation of imported technology. With on-line systems, new

data added to a data base in, say, California, becomes immediately accessible in Osaka or Frankfurt. Moreover, it would technically be difficult (and in breach of antitrust laws) to discriminate against non-American customers in terms of price.

A related issue is that of security of supply. Intervention in some industries (defence, energy, aerospace) is justified on the grounds of political risks. The question in this context is how likely would it be—and how serious—for American data base producers to 'cut off the tap' to Europe for political reasons. This eventuality seems most unlikely to the present author.

The third aspect of resentment of American dominance is that of European prestige. This again is hard to quantify.

Altogether, the 'technological balance-of-payments' benefit of producing data bases in Europe—including the security and prestige benefits—needs more clarification. But if there is such a benefit, it would again be proportional to revenue.

The main third-party benefits of producing data bases in Europe, rather than using those produced in the USA—balance-of-payments, multiplier effects, and perhaps the 'technological balance-of-payments'—are thus proportional to the revenue generated.

There may also be some extra benefit directly related to increased usage: developing the European information industry will accelerate the availability and use of information in Europe, as well as elsewhere, with the innovation and other benefits previously discussed. But this is only a temporary benefit; after a year or two, the time till be reached when, if a European data base has not been launched, an American one will have been, bringing the same benefits to the user. Subsidizing the production of data bases in Europe is a much more expensive way of getting the user benefits than would be a strategy of stimulating usage in Europe, and encouraging European firms (perhaps in partnership with American producers) to exploit the opportunities.

The striking common feature of all third party benefits discussed so far is that they are proportional to the usefulness and use of the data base. *They are thus highest for the most profitable data bases.* If no-one used the data base, there would be no third-party benefit.

The one exception to this rule that might be suggested is the benefit of job creation. But most of the jobs will be for young graduates, living in areas of low unemployment. In particular, there will be jobs for those with above-average intelligence, and with degrees in science, technology and economics. These graduates are a scarce resource, with a lot of public money invested in their education. The fact that the information industry will make some of them unavailable for employment elsewhere is a cost, not a benefit; if they emigrated to the USA, we would talk of them 'going down the brain drain', and rightly consider it a loss to Europe. The scope for employing unskilled workers in areas of high unemployment is minimal. While the 'electronic revolution' will remove the geographical constraint, it will intensify the knowledge constraint; the information industry of the 1990s will be capital-intensive, and most of those working in it will be graduates. Fortunately, the number of key graduates the industry will divert from other sectors is small in absolute terms. So the cost will be small in relation to the benefits.

To saddle this industry with the task of creating jobs for unskilled workers in areas of high unemployment would, in the author's view, be quite wrong. The EEC has enough 'lame ducks' already, without breeding more for the 1990s.

Benefits of developing distribution

The arguments which apply to the benefits of developing the production of data bases in Europe apply also to the development of distribution. In this case, however, there may be a stronger case for supporting loss-making activities

The externalities may be greater: distribution is more infrastructural (cf. EURONET)

The distributor is closer to the user, and may also be more aware of his needs. European on-line service operators may be better than their American counterparts at seeing European needs and ensuring that they are met—perhaps by initiating the development of new data bases.

In practice the proposed EURONET hosts are almost all public-sector.

An important strategic question is: should EEC policy be to encourage the setting-up of more EURONET hosts, or the rationalization of those already proposed? The EEC cannot tell its members states what to do, but it can use its influence in one direction or the other. Which direction is right should be determined by a study of the pros and cons of having a large number of hosts:

In favour of having many hosts: ability to specialize in certain kinds of data and/or user; perhaps the trend towards distributed processing favours having many hosts (but in the long run, perhaps it favours eliminating hosts altogether).

Against having many hosts: simplicity for the user, learning and experience—especially in the development of on-line software.

The two factors which might go either way are the impact on EURONET traffic, and the economies or dis-economies of scale. The latter question comes down to the following: If we compare a small on-line system with a bigger one which costs five times as much and handles five times as many transactions, which will have the faster response time? During the 1960s, the answer would have been the bigger one, because its hardware performance would have been much more than five times that of the smaller system. But hardware economies of scale are now less marked. With a fairly simple system, there may still be advantages in going for a bigger system, due to better resource-sharing and improved queueing characteristics, with transactions arriving irregularly, the effect of increasing scale is to smooth out some of the irregularity

But as the system gets bigger and more complex, the task of controlling its operations tends to grow disproportionately. So the stage may be reached when this extra overhead reduces performance by more than the increases due to hardware economies of scale and better resource utilization

From a user point of view it is not clear whether, three to five big hosts on EURONET would be preferable to fifteen or twenty-five equally efficient ones. On balance, the benefits of simplicity would probably outweigh the costs of remoteness and lack of specialization.

But present indications are that the fifteen hosts would be less efficient. This is partly because the 'static' economies of scale discussed above would probably, on balance, favour the bigger systems. But much more important are the 'dynamic' economies of scale due to learning and experience.

Lockheed have been operating on-line for over ten years. The cumulative volume

of transactions they have handled is now vast. There is extensive evidence that a firm's unit operating costs in a given product-market are systematically related to the firm's cumulative experience in that product-market: a doubling in the cumulative experience leads to a fixed percentage decrease in unit operating costs. The percentage cost reduction varies between product-markets, but in the case of on-line service operations could be 20 per cent or so. The EURONET hosts have somehow to overcome this experience barrier.

The proposed fragmentation of on-line service operations among the fifteen or so EURONET hosts may tend to increase the gap between the performance of American and European on-line software. If the present analysis is correct, the EEC should use its influence to encourage rationalization of the EURONET hosts, to yield a smaller number of bigger operators, each with enough volume to gain significant benefits from the 'experience curve'—albeit not on the scale of Lockheed.

The analysis here has been rough-and-ready. A more rigorous analysis may produce more encouraging conclusions. But it seems to the author that such an analysis should be an early task in the Commission's study programme.

Costs of intervention

In direct financial terms, the costs of intervention depend mainly on the level of strategy adopted:

Minimal intervention: minimal cost;

EEC as a catalyst. \$2 to \$3 million/year;

EEC as a source of funds—\$10 million/year on top of expenditure on 'catalyst' activities.

In the case of the latter strategy, some of the expenditure would be capital, not current, in the sense that the money would have been invested in the expectation of at least some of it being repaid.

Many economists argue that direct financial support of development projects has important hidden costs, as well as direct costs⁴⁻⁸.

Only 'second-best' projects are proposed for public support.

Government officials lack industrial experience, and are not well qualified to judge commercial prospects. In particular, it is hard for officials to judge the user requirements in any given industry.

Officials are under pressure to support commercially-questionable projects for political reasons.

The managers responsible for a project devote their energies to political lobbying instead of to production and marketing; they also spend time manipulating the project so as to give real or apparent social benefits.

Scarce technical, financial, and managerial resources are diverted from commercially more promising projects

An important element of uncertainty is introduced.

Once started, government-supported projects are even harder to stop than projects inside the firm, because of extra political pressures.

These arguments apply *a fortiori* to intervention by the EEC, as opposed to a national government. For instance, it could be that only third-best projects were proposed for EEC support.

Especially complex would be cases where both the EEC and the national government were involved. One danger here would be the double-counting of social benefits. This raises another strategic question what should be the dividing line between EEC and member-state government intervention?

III. Conclusions

It is not possible to define a strategy for the European information industry and market until answers have been agreed to the four strategic questions posed at the commencement of this paper.

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APPENDIX A *Some tentative answers: a personal view*

In Section I we raised four basic questions that must be answered before appropriate innovation policies can be formulated. Section II gave a subjective, rough-and-ready view of how one might set about answering the questions, by discussing the benefits and costs of different strategies. This Appendix gives some tentative answers to the questions raised in Section I, based on the discussion in Section II. These answers are meant as inputs to the Workshop: they reflect the author's prejudices and are in any case not fully thought through. The real priority is to come up with some more solid, agreed answers, by a process of debate and further study

Underlying objectives

On the fundamental question of objectives, it seems to the author that some objectives are much more important than the rest:

The most important aim is to support EEC industrial innovation.

The second aim is for the European information industry to be profitable

The third aim (in line with the second, but partly in conflict with the first) is to reduce the financial balance-of-payments deficit in the information field. This deficit has been mostly caused by weaknesses in distribution, not in production, i.e. prohibitively expensive telecommunications (now rectified by EURONET), causing great weakness in on-line service operations (the biggest problem facing the industry now), and incompatibilities and uncertainties caused by the large number of government bodies in the EEC, compared with the USA

If these objectives are met, the other benefits will follow, with the one exception of the suggested employment benefit. As argued in Section II, in the author's view this supposed employment benefit is based on the fallacy that all new employment is socially desirable. In this context, it is argued that the diversion of high-quality science graduates from other sections into the information sector is a small but necessary cost, not a benefit; and that any attempt to use the information industry to create jobs for unskilled workers in areas of high unemployment would be a disaster.

The main effect on unemployment will probably be indirect, via the effect on industrial innovation. We do not know what the effect of innovation will be, but present evidence suggests that, at least in the 1980s the effect will be to increase unemployment—while also increasing economic growth. Beyond the 1980s, the effect may be to protect employment, by maintaining the competitiveness of European industry, but unemployment levels may still be very high by post-war standards. How the EEC will cope with these problems lies well beyond the scope of the present discussion.

In the present context, perhaps it would be best to leave employment effects out of the discussion altogether, and accept that public policy is to encourage industrial innovation, despite any possible short-term unemployment effects.

The author's views on the first basic question—the objectives—lead on to his suggested answers to the other three questions.

Information market or information industry?

Since the main objective relates to the use of information, the main long-term emphasis should be on developing the European market, not the industry. How this can be done is discussed in Anthony's paper for this Workshop, which lists the barriers to usage, and some public policy measures to reduce the barriers and promote the benefits of using published information (At a parochial level, the London Graduate School of Business Studies has recently produced a tape-slide presentation, 'Desk-Bound', on the benefits of desk research in libraries. Without any real publicity, over twenty copies have already been sold to other business schools and colleagues—causing some embarrassment in meeting such a demand. This largely-unsolicited market response suggests that there is a large gap in the material currently available.)

But in the short-term—the next two or three years—there is a case for reversing the priorities, setting the European house in order before large-scale market development. The main priority should be to rectify the distribution weaknesses mentioned above. On this basis, the European information industry should be in better shape to exploit the increase in demand when it comes, thus meeting the second and third objectives—profits and balance-of-payments

Another reason for not immediately pursuing large-scale market development relates

to user needs. We must develop a better understanding of these needs, and be confident that the information services are meeting them, before we attempt to persuade users to devote time and energy to using the services. It would be quite wrong to try to make users waste their time with the wrong systems, or with systems not fully developed.

This brings us to the question of the scope of EEC intervention.

On-line information or all useful information?

Once it is decided that the long-term priority is not the industry but the market, i.e. the meeting of user needs, it follows that EEC policy should cover all useful information, not just on-line information. In the short term, there will rightly continue to be a bias in favour of on-line developments, because of the strategic importance of EURONET and its host computers. But care must be taken to avoid discriminating against other technologies, or missing out on newer ones. On-line technology represents only a small part of the information industry.

Perhaps the best way of ensuring that studies and policies take a broad view is at all times to emphasize the perspective of the user.

The level of EEC intervention

It will be clear from the discussion in Section II that the author's prejudices are against the use of financial subsidies as a general policy in this area. In particular, the author could argue against direct subsidies to user organizations for use of information (except perhaps for a trial period for each user, as part of a wider promotional campaign), and against subsidizing the production of information—this will be discussed shortly. In these areas, he could argue that the EEC's role should be as a catalyst.

But in the area of distribution, it seems to the author that a strong case can be made for continued public support. If the author's hunches are right that European on-line software is inefficient by US standards, and that the fragmentation of on-line operations envisaged on EURONET will make matters worse, this becomes an area for urgent action. If the analysis here is correct, the priority should not be to increase the level of resources devoted to on-line service operations, but rather to encourage concentration of those resources into a smaller number of highly efficient centres—half a dozen at the most.

With regard to production of data bases, however, the author's view is that the EEC should act as a catalyst, not as a source of funds.

The direct and indirect costs of acting as a catalyst are relatively low, the benefits of removing market imperfections are unquantifiable but significant. (Appendices B and C review some of the opportunities and potential policies.)

These arguments must be debated, but would probably be accepted by most of those who would advocate that the EEC should go further than this, onto the level of direct subsidies. Why does the author disagree with such advocates of direct subsidy? He argues that there is no case for supporting loss-making data base projects over the period 1981–85, because:

The direct costs are high, and the indirect costs perhaps even higher.

The third-party benefits are less than has often been assumed; market imperfections are more important than externalities

The main third-party benefits are proportional to revenue, i.e. highest for the most profitable data bases.

The unprofitable opportunities will still be around in 1985, but the most profitable ones will already be being exploited.

On this argument, the underlying objectives may be re-phrased in more operational terms. The aims should be to:

stimulate the profitable use of information in Europe;

ensure that as many as possible of the profitable opportunities in the world information market—outside as well as inside Europe—are exploited by European organizations.

The general approach proposed is one of market—not production—orientation.

The response to American dominance should not be to produce the data bases the Americans would not want to produce, but rather to produce those they would want to, before they do.

Turning this strategy into a reality is another story; the two following appendices list some of the options.

APPENDIX B *Data base opportunities (notes)*

Market opportunities

Two kinds of opportunity:

Copy over here something which is already being done in the USA. Find these opportunities by analysing American data bases.

Produce something which does not exist in the USA or elsewhere. Find these opportunities by analysing managers' information needs, and/or what is available which can be turned into a marketable data base.

Most opportunities are for source, not reference, data bases, in business/economics/legal area.

EEC producers are at a slight disadvantage with text data bases, because of language differences. There is less disadvantage with numeric, representational (e.g. chemical structures) or other symbolic data, and no inherent disadvantage with data processing, i.e. timesharing, which is a profitable area in the USA.

Who could exploit the opportunities?

The main opportunities are for the production of public, on-line business source information. An analysis of American experience should help identify the types of organization most likely to succeed. General principles would indicate that the following are in a good position to exploit the opportunities:

Organizations with *private* on-line business information, i.e. firms with in-house data bases.

Organizations with *printed* (or batch) public business information, i.e. those which already collect and publish source information (primary publishers, governments, the business service sector).

Organizations which already produce public *scientific and other reference* data bases, e.g. abstracting and indexing organizations.

Organizations which operate *on-line services*, including timesharing services.

Organizations which represent *user groups*, especially those that meet the information needs of users sharing a particular interest, e.g. special libraries, trade associations

Entrepreneurs with good ideas, looking for financial backing. Most of those with the best ideas will have specialist knowledge from working in one of the above types of organizations.

In order to exploit an opportunity, some of these organizations would do best to work in partnership, because they have expertise in some areas but lack it in others, or because each partner can produce a small data base, but only by integrating the parts can a commercial 'critical mass' be reached.

APPENDIX C *Specific policy options*

Market research: short- and long-term

Short-term: find opportunities for profitable data bases.

Long-term: more understanding of the role of outside information in improving performance of the firm, plus research into better communication of text data (structure, use of language, tables, graphs).

Promotion of opportunities

Actively seek and stimulate European organizations to exploit the opportunities. Encouragement of co-operative ventures where appropriate.

Technical and marketing support

Direct support via limited free advice plus standard technical/marketing tools (e.g. checklists, manuals, mailing lists); and subsidy of consultants' fees.

Distribution, infrastructure, and technology

Continue development of EURONET, viewdata, teletext. Investigate optimum number of EURONET hosts. Continue support of the optimum number of hosts, with emphasis on software development to improve performance (capacity/response time). Continue research and development into new technology for handling and disseminating information, including software (referral systems, command languages, multi-lingual systems). Continue review and limitation of barriers imposed by unco-ordinated national policies.

Direct support: profitable data base projects

Set up new Information Venture Bank, in partnership with commercial bank(s) IVB would be a venture capital organization, specializing in the information industry. Aim to make money by actively seeking opportunities to take equity stake in profitable new ventures in the information industry. IVB would be a separate organization from any agency set up to implement the other policy options. There might be potential

problem with transfer pricing and overhead allocation between new ventures and their parent companies.

User education: short- and long-term

Gradual build-up 1981-85. Starting with large organizations moving on to smaller ones. Eventually (after 1985) promoting on-line systems to the general public, via viewdata teletext, and TV programmes. Meanwhile, increase exposure to on-line systems in colleges and (later) schools.

Recommendations

THE FOLLOWING RECOMMENDATIONS were made by the Workshop:

1. *Copyright*

Copyright problems were agreed to be a barrier to the development of the European information industry. The problems fall into two main categories: the more general problem of copying the original document for third party supply; the inclusion of published material in data bases

It is recommended that the Commission arrange for the preparation of a statement of the current position on copyright in the member countries, as a general reference in relation to these two problems.

It is recommended that consultancy assistance be provided on a cost-sharing basis for the information industry to give advice on specific problems.

2. *Governmental information sources*

Important non-classified material for potential data bases is known to be provided by government and government-supported activities

It is recommended that the Commission see that rules are formulated permitting easy access to this material and its use for data base construction by the information industry.

3. *Financial support*

Differences in government policies and the effect of subsidies were felt to be a distorting factor for the development of a natural competitive market place and to be adding to the uncertainty facing the information industry.

It is recommended that a survey be made of policies, practices and subsidies regarding information services within the member states and that particular reference be made to future plans in order to remove uncertainty

It is recommended that steps be taken to harmonize policies, to reduce those subsidies which create unfavourable conditions for free competition and, wherever possible, to enable and encourage private enterprise to take over the market information services developed by government programmes and subsidies.

4. *Fiscal measures*

The application of VAT is felt to be a constraint on the growth of the market and inconsistencies are observed in the application of the rate to different information products.

It is recommended that the Commission take steps to harmonize fiscal policies in relation to information products in the member countries, particularly to harmonize VAT at the minimum possible level

5. *Marketing of European information products*

The discussion papers presented in the workshop revealed, and it was confirmed in the Workshop, that there are a surprisingly large number of European data bases. These were felt to be inadequately exploited for a number of reasons: lack of penetration to users, need for improved training of intermediaries; and difficulties in exporting European data bases and information services.

It is recommended that a joint Community information industry mobile marketing venture be established to promote information services to individual users, groups, organizations and at public events.

It is recommended that a joint Community information industry series of training seminars be arranged, aimed at increasing the effectiveness of intermediaries, consultants, information brokers and others in the provision of information to the user.

It is recommended that possibilities be explored and measures taken to open the outside market and in particular the North American market to the European information industry.

6. *Venture capital*

The difficulty in obtaining venture capital for the creation and development of information services was recognized. However, it was not felt that this was a major obstacle for which, in general, subsidies were required.

To strengthen the growth of the information industry financial assistance is conceivable in the following forms

It is recommended that the Commission make the banking industry aware of the needs and potential of the information industry.

It is recommended that the Commission investigate the possibility of providing guarantees.

It is recommended that the Commission investigate measures to lower the effective rate of interest ('soft loans') for multinational projects and exports.

7. *Technical assistance*

The complexity of information projects and the wide variety of problems involved require expertise in many fields which is unlikely to be available in organizations without previous experience. Technical assistance could facilitate the starting of new ventures and the development of existing services. This assistance could be in areas such as: software, market needs, and selection of media and equipment.

It is therefore recommended that position reports be prepared in these areas and consultants' services provided on a cost-sharing basis.

The software support should include information and assistance in the selection and use of standard software products and aid in connecting services to EURONET. The market research should identify general market needs and possible areas for new products

Position reports on selection of media and equipment should review the impact of new technologies and combinations of these.

8. *Other recommendations*

Other recommendations made by the Workshop were:

The Commission should be encouraged to continue its efforts to harmonize and reduce telecommunication tariffs.

The attention of member states should be drawn to the need to include aspects of information services in educational curricula at the various levels.

A study should be made of data base software for microcomputers and personal computers.

The Commission should encourage collaboration within the information industry through appropriate associations.

A review of American developments should be made, in particular regarding government policy related to the information industry.

Member state governments and the Commission should be encouraged to be exemplary users of information services.

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Co-operating for economy: international co-ordination of information services

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Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

Background

SCIENTIFIC AND TECHNICAL information (STI) systems, in the wider sense of the term, have a long history of internationalism. The communication of research results has, from the earliest days, necessitated some form of international co-ordination through, for example, learned societies and international publishing enterprises. However, it would be impracticable here to try to review the whole process of scientific communication, ranging from primary publication to alerting services and the like; instead, it is proposed to concentrate on a sample of secondary services for the creation of machine-readable and printed versions of STI data bases on the one hand, and some of the more general aspects of the economics of use of such data bases on the other.

Within this admittedly narrow concept of STI systems, the degree to which economic considerations play a significant role in determining the international character of such systems will be briefly examined. However, as East¹ has pointed out, the motivation for an international approach in secondary services is not solely economic. Technical considerations leading to better performance of an internationally-based system are also important. Imponderable factors which East classes as professional, political and humanitarian, have in recent years constituted an important motive for an international, rather than a purely national, approach to the establishment of secondary services.

Data base creation

Source of data

The data quoted in this section are mainly derived from a case study of some eight information systems carried out by the present author² in 1975-6 for the Commission of the European Communities. The eight systems were examined in relative depth, from the point of view of historical background and system development, organization management and operation, and costs and statistical data on input, including matters which might have an important relationship with costs, for example, number of inputting centres and timeliness. It should be noted that cost data quoted from this

study in the present paper relate to pre-1976 values of the currencies concerned. No attempt has been made to correct for subsequent inflation or revaluation of currencies.

Types of co-operation

Aside from purely national systems with little or no outside participation, and purely commercial systems, co-operative secondary services can be conveniently described in three types, based on their management structure. The first type covers those nationally managed systems which have international participation through bilateral agreements. The MEDLARS system is typical. The second type includes internationally managed systems with a centralized management structure (e.g. INIS), while the third type, typified by IRRD, involves a degree of decentralization of management to designated national centres. This decentralization may be language-based, as in the case of IRRD, or function-based, in which collaborating national centres are responsible for different parts of the operation (e.g. IFIS). It must be stressed that the use of the term 'centralized' or 'decentralized' in this classification relates only to management, not to methods of collecting or processing the input material. All collaborative systems involve, to a greater or lesser extent, a degree of input decentralization, and the effect of this on system economics will be discussed in subsequent paragraphs.

The systems on which data were obtained for the case study are grouped in Table I below in terms of these broad management types.

TABLE 1 *International systems*

Management type	System	Producer
I National with international participation	Earth Sciences (GEODE)	BRGM/CNRS (France)
	MEDLARS*	NLM (USA)
	TITUS	ITF (France)
II International organization (centralized)	INIS	IAEA
	SDIM	CEC†
III International organization (decentralized)	IFIS	CBDST (UK) and IDW (Germany)
	IRRD	LCPC (France), BASW (Germany) and TRRL (UK), co-ordinated by OECD

* The study concentrated on the operation of the bilateral agreement with Germany (DIMDI).

† Since replaced by a bilateral agreement between France and Germany

Costs per item of input

In general, we can break down costs per item into, firstly, costs for the intellectual work involved in scanning sources, cataloguing, abstracting (where abstracts are

included), and indexing, plus the clerical work associated with preparation of this material; and secondly, processing costs, i.e. the costs involved in preparing the material for entry into the computer, data processing, printing, and dispatch. It is very difficult to obtain compatible figures from different information systems, since accounting methods and the actual operations themselves differ widely. However, Table 2 lists the figures obtained in the 1976 case study.

TABLE 2. *Summary of costs per item of input*

System type	System	Intellectual cost per item \$	Processing cost per item \$	Total cost per item \$	Remarks
I	Earth Sciences	23	unknown	—	—
	MEDLARS	2.25-2.75	unknown	—	—
	TITUS	14	8.5	22.5	—
II	INIS	20	20	40	includes element for IAEA overheads
	SDIM	12.5	10	22.5	—
III	IFIS	15	8.5	23.5	—
	IRRD	30	18.5	48.5	based on average costs 1973

In interpreting these data, the following anomalies require explanation

There is a very low intellectual cost of preparing input to the MEDLARS system as compared with that reported for other systems. An element in this low cost is undoubtedly the streamlining of the input process: no abstracts are prepared, there is no translation and no editing of author abstracts. However, it was not possible to quantify these factors in the study.

There is a discrepancy between the costs reported for INIS and those for SDIM which, at the time, were very similar systems. An analysis of processing costs in both cases showed, however, that personnel and associated costs were significantly lower for SDIM than for INIS, and that this accounted for much of the difference. Perhaps one reason for this was the greater need to train personnel from the inputting centres in the case of INIS. The costs quoted for IRRD are somewhat suspect since they were based on average figures for one year in the early lifetime of the system, and these averages hide a very wide standard deviation.

Economic consequences of input decentralization

A clear and obvious consequence of international collaboration designed to spread the intellectual and clerical workload of preparing material for input to a major information system is that costs to each of the partners are reduced, while each

receives the benefits of the product as a whole. The result is attractive to all parties, particularly when the actual costs incurred by each participant are of the same order. The National Library of Medicine³ computed that, for 1974-5, the annual value of the input acquired as a result of eight bilateral agreements amounted to about \$400,000 or nearly half the total cost of creating the data base. The bilateral agreements provide for exclusive right to exploit the machine-readable version of the data base within a geographical region in exchange for a *quid pro quo* to provide input at an agreed price per item to a particular dollar value per annum. The arrangement is therefore in some sense a commercial one, even though no funds actually change hands. Much the same system is in fact used by commercial data base producers (e.g. Chemical Abstracts Services).

Systems in which the input load is shared among many centres are highly beneficial to small centres who receive a major data base in exchange for inputting a few tens or hundreds of documents per year, but are less economically attractive to the major partners who have to incur sizeable domestic costs for their own input, in addition to their share of the central costs. In most such cases, the larger contributors are motivated as much by political or other non-material considerations as by purely economic criteria. Thus, the USA found it acceptable to make a major contribution to INIS while continuing to produce their own NSA service during the early years of the international system

There appears to be a relationship between per-item costs and numbers of inputting centres in an international system. This is demonstrated in Table 3 which brings together data on numbers of inputting subcentres, the percentage of annual input arising from subcentres, total input per year, and costs.

It will be noted that, among the international systems considered, all except two (IRRD and INIS) operated with less than ten subcentres for input, it does not seem to be merely a coincidence that IRRD and INIS turn out to be the most expensive systems, in terms of both intellectual and processing costs. We have already noted that a multiplicity of small input centres place a heavier burden on central training facilities than few large subcentres; it also seems reasonable to suppose that the clerical and intellectual work of preparing input can be organized more cost-effectively when larger volumes are handled by a full-time crew than when the operation is split into penny packets dealt with by individuals having other duties. At all events, this was found to be the case in the early history of IFIS when the numbers of inputting centres had to be reduced to prevent rising costs and to improve timeliness. From a political point of view, however, it could well be argued that many small inputting centres are better than a few large ones. Such a system design will promote STI activity in smaller or developing countries which otherwise would have little opportunity to make a contribution to world systems.

General comment on levels of input costs

There is no doubt that methods of collecting and processing material for input to create a machine-readable or printed data base, covering a major part of world STI literature in a subject- or mission-orientated area, is a highly labour-intensive operation, resulting in total costs which can amount to \$40-\$50 per item. While some of the low cost cases can be accounted for by more efficient or more economic organization of the work, and it is almost certainly true that there are extra overhead costs to be met

TABLE 3. *Input decentralization and costs*

System	Approx. cost per item \$	Annual input rate (1975)	No. of input sub- centres	Input supplied by sub-centres	Remarks
Earth Sciences	—	35,000	7	75%	—
MEDLARS	—	220,000	9	47%	—
TITUS	22.5	28,000	5	66%	—
INIS	c 40	63,000	62	nearly 100%	IAEA inputs own material but quantity is small in relation to total output
SDIM	22.5	26,000	5	nearly 100%	similar basis to INIS
IFIS	23.5	17,000	7	about 30%	was originally 50%
IRRD	48	10,000	21	—	three co-ordinating centres input their own national materials plus that from other centres working for them

in internationally-managed centralized systems, this is probably not the whole story. Perhaps, in addition to analyzing the cost components for like operations in the production of traditional bibliographic data bases, we should also look at the levels of such cost components for international systems in terms of their actual value to the user, particularly as total costs seem bound to increase. One should perhaps begin to examine such questions as the degree to which a user needs and is prepared to pay for sophisticated indexing and its associated vocabulary control. Retrieval services based on quick and simple use of title-page information with the minimum of reprocessing are perhaps a pointer, but these questions involving relative cost-effectiveness of input methods in general are well beyond the scope of this paper.

International factors in economics of on-line systems

One of the factors in the rapid growth of on-line retrieval systems in the last decade has been the economies of scale which are inherent in this form of timesharing of

computer and telecommunications facilities. In theory, unit costs should decrease as the number of users of a system increases, although not in direct proportion. It might therefore be expected that such relationships would favour the development of international systems serving a large number of users. In Europe however, the growth of international systems was slower than expected in the early years of the present decade, in spite of the pioneering work of the European Space Agency in steadily expanding the on-line coverage of its information retrieval service. More recently however, two new factors have entered the picture: TYMNET and EURONET. The arrangements between the European telecommunications administrations and the major American data networks have resulted in communications charges to the European user of the large American on-line services which are competitive with the communications costs of 'private' European international networks. This is one of the factors which may have contributed to the rapid growth in the use of US-based services in Europe.

The collaboration between the CEC and the nine telecommunications administrations in the establishment of EURONET will have important consequences on the economics of European-based on-line services. Communications charges for traffic within the network are very low, and should favour increased use of European on-line systems, but some distortion may occur as a result of the relatively high charges required by some administrations to access the local EURONET node from remote locations.

Cost elements in on-line searching

In a previous paper,⁴ the present author analyzed the trends in the make-up of user charges for on-line searching. In the early years of on-line, the charges could be divided into approximately equal amounts for communications and computer centre costs, with an insignificant element for royalties to data base producers; by 1978, the proportion of the total charge represented by data base charges had increased to something approaching one quarter of the total hourly charge for popular data bases. Thus, while international action had had some effect on reducing the telecommunications element, the factor beginning to dominate the total charge paid by the user was the data base element. In practice, total hourly charges were tending to increase, rather than decrease, with increasing use of on-line services. Since the paper was written, Barwise⁵ has studied the likely changes in sources of data base producers' revenue as a consequence of increased on-line use. He concludes that more revenue will have to come from on-line royalties in order to secure the position of the printed version, and suggests that the level of data base royalties might double in the period up to 1981, with the possibility of slight decrease up to 1985.

Economic factors in on-line service strategies

Up to the present, it has been necessary to use large computer installations to provide an on-line service for an external clientele, although experiments in data compression and streamlining retrieval software may one day make it possible to use much smaller machines to search a one-year section of a major bibliographic data base. The annual costs involved in renting main-frame hardware, and providing the necessary facilities, including personnel for operating and software maintenance, could easily amount to something of the order of half a million to a million dollars, if the computer system

is dedicated to the on-line service, and the service itself is unsubsidized, this will mean that, at a price of \$50 an hour plus communications costs and data base fees, the service operator will need to operate at a level of between 10,000 and 20,000 hours per year if he is to recover his system costs, or between 20,000 and 40,000 hours a year at a price of \$25. Experience shows that, in Europe at least, marketing of on-line services to reach these levels of use is no easy task.

One solution is to increase the number of data bases offered, this increases overheads by the cost of the additional storage required, perhaps about \$30,000 per year per million references, but this is a relatively small proportion of total costs. Thus, the argument for this strategy suggests that by offering more data bases, an operator can serve more clients with the possibility of gaining much more revenue than the extra costs he has to incur to accommodate the new data bases. His high fixed costs are thus spread over a larger number of connect hours. It is probably these kinds of considerations which have led to the emergence of STI supermarkets such as Lockheed Information Systems in the USA, which offers over a hundred different data bases.

While there are advocates of the supermarket approach among European on-line operators, EURONET will have many more host organizations offering data base services to what appears to be a smaller market than is covered by the much smaller number of large operators in the USA. Some twenty host organizations have been accepted for the first phase of EURONET, initially offering services on ninety-six data bases, with services on a further eighty-seven being planned. However, a large proportion of the data bases offered or planned are relatively small and specialized, with probably rather low use rates. It appears that some twelve data bases will be offered by one or more host organization during the initial phase, with further duplication occurring as the result of additions now being planned. On the face of it, the competition for customers for the popular data bases, almost all of which are duplicated and some triplicated, could result in few major hosts reaching the level of some tens of thousands of hours used per annum which seems to be necessary if costs to the user are to be competitive with those of the US-based services. However, there is some evidence that customer preference in choosing among on-line services is not a simple matter of selecting the cheapest vendor of a particular data base. The ability to search a family of data bases without switching from one operator to another, reliability, preference for a single retrieval system rather than several, etc. all seem to play a part, and recent growth in the use of on-line services in Europe has not, it seems, necessarily gone to operators offering the cheapest service.

Nevertheless, the problem faced by some EURONET hosts in achieving sufficient use to cover their costs may be severe, and in the long term, if all of them are to stay in business, a different solution must be found. Some possibilities are.

- a. Straightforward subsidy by national authorities as part of a policy to preserve independence in STI retrieval capability.
- b. Diversification. Maintaining a major computer installation purely for STI retrieval may be the wrong policy under European conditions, and if costs could be spread over several applications, the requirement of achieving tens of thousands of connect hours use to break even for the on-line service would no longer be valid.
- c. Enlargement of the customer base to provide greater potential economies of

scale. For example, most of the major data bases in pure and applied science are bibliographic in nature, and this means that, in general, users will come from the research and development or academic communities. The addition of more data banks giving economic, commercial, and marketing information, could, in the view of many, enlarge the potential market for on-line services tenfold, to include managers, administrators, policy-makers and their advisers.

- d. An export drive. Eastern Europe and the third world constitute potential markets for on-line services, as yet virtually unexploited. If on-line operators in Western Europe could market effective services, and if network access problems could be solved, this solution would become possible. However, the steady extension of the major American networks might perhaps give the US-based services the competitive edge in this respect.

Conclusions

In both the aspects selected, data base creation and on-line exploitation of STI data bases, international co-operation at the government, inter-governmental, or international agency level has played a large part in determining the economics of access to STI by the individual user. However, in both areas, considerations of a non-economic nature, such as the technical or political desirability of certain solutions, have been highly significant in determining the way in which international co-operation is effected. For example, inter-agency or inter-governmental co-operation in the creation and production of a world secondary information system has often been motivated by non-economic considerations, and has therefore resulted in a systems design which would not be justified if cost were the only factor. Again, economics would suggest that a competitive European on-line retrieval facility would consist of at the most two or three complementary services sharing the market, rather than the many host organizations proposed for EURONET. From a political point of view, such a solution is clearly unacceptable.

However, the development of STI services of all kinds is only partly a matter for governments, government agencies and international organizations. An increasingly large part of the two types of services discussed in this paper is provided by commercial services, whether these be based on learned societies, commercial publishers or on-line entrepreneurs. In these cases, clearly, economic considerations play a large and significant part in determining the size and shape of these operations. Collaboration among institutions in different countries will, for the most part, be motivated by commercial or operational considerations.

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Statistics: an active force

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I AM PROUD to be a statistician. I like to reply to the question 'What are you, Mr Boreham?' with 'I am a statistician', in ringing tones. Of course at my advanced age I could be expected to be proud of my trade, having committed most of my working life to it. So you may discount my pride if you like. But I sincerely believe that I am not merely putting a good face on a mis-spent life. I am willing and able, I think, to show that a life committed to statistics is not mis-spent and in this paper I will try to do so. There will be three sections in it. The first will establish statistics as a basis and handmaiden of all sciences. The second will establish it as the basis for the control of all processes. The third will establish it as the essential engine of the next phase of evolution.

I am now Head of the Government Statistical Service, which exists, first and mainly, to provide a service to government. I shall not discuss the Government Statistical Service in relation to the role of statistics as the basis and handmaiden of all sciences, because this role underlies the other two and because government is mainly concerned with social and economic processes. The primary objective of the Government Statistical Service is to make sure that ministers and administrative officials always have available timely, reliable, relevant and comprehensible figures and descriptions about the actions for which they are responsible.

These actions are to develop and subsequently to implement a policy. The policy may be concerned with running quite specific operations such as the National Health Service or with running something vaguer such as the economy.

The actions of government nowadays consist very largely of spending money for various publicly provided services and, if necessary, making laws for the regulation both of those services and of the behaviour of people. Consequently the role of the Government Statistical Service could be described as providing management information systems for the Defence business, the Health business, the Law and Order business, etc.

That description does not deal satisfactorily with the half of the Government Statistical Service which serves central economic policies. I am not going to open up the question of what is the appropriate role of the government in central economic policy because that is a political question which does not concern me. It is, however, a fact that the government's actions in spending money on publicly provided services and in raising money to pay for them affect the state of trade and inflation. Accordingly the economy must feature in the government's thinking and planning about the services that are to be publicly provided. There is therefore a need for the Government Statistical Service to provide measures of economic activity, employment, inflation,

foreign trade, etc Only then will the government have at its disposal not only the management information systems necessary for controlling the social processes involved in the publicly provided services but also the management information systems needed for taking account of the effects of those actions on the economy

As to the role of the Government Statistical Service in relation to evolution,,it is, I think, quite clear that unless statistics about society and the economy are made available through publication outside government, members of society will not be aware of its structure and behaviour. It is that awareness which, I shall suggest, is the essential engine of the next stage of social evolution

The basis and handmaiden of the sciences

One way in which I could justify this claim for statistics would be to give a long list of examples I would mention genetics, in which the role of statistics is very obvious. Another rather more elaborate example would be the role of statistics in medical diagnosis; it is quite interesting that this seems now to be gaining open recognition as is illustrated by the possible use of computers in diagnosis. Another example would be the analysis and treatment of signal spectra in electronics and communications, that example is particularly interesting because the techniques used have now spread into other fields of statistics including econometrics. I think that approach would be quite convincing but for two drawbacks. The first is that it would take a very long time. The second is that I am not sure whether I am really qualified to describe the examples, I am a statistician, not a polymath.

Consequently I prefer to justify my claim that statistics is the basis and handmaiden of the sciences by making the two points which I think underlie all the examples, of which I have mentioned a few. The first concerns the basic nature of matter and the second concerns the philosophy of science.

There is a passage in the writings of Sir Arthur Eddington¹ in which he writes fancifully about having two tables beside him. One of them is an ordinary affair made of wood, solid, with legs firm, standing straightforwardly beside him. The other is a more shadowy affair consisting mostly of open space with scattered particles oscillating and flying about, comprising among them something shaped like a table but with fuzzy edges and with some of the particles shooting off outside the rough outline, never to return. Eddington's puzzlement was, of course, all put on for the sake of exposition; he was discussing what he was seeing, and that does not concern me now. My point is that matter really does consist of tiny particles vibrating and whizzing about, sometimes leaving the boundaries of the objects that they constitute never to return. This rather unsatisfactory nature of matter is of no consequence for a great deal of practical life and even for a great deal of scientific observation. What you see or feel is good solid matter, not this elaborate structure of particles and movements. If your concern is to measure the co-efficient of expansion of some substance, you are quite safe to measure its dimensions in the ordinary way at various temperatures and you can forget about the vibrating and migrating particles. Perhaps a better example is that if you are concerned with the relative movements of large objects in collision with each other—billiard balls, for example—you can safely ignore the very tiny probability that all the particles at the frontiers of both objects will, by chance, oscillate away from the other object at the same instant so that although the balls

collide they will not rebound. That is so unlikely as to be safely negligible. However if the objects in collision are quite small, and especially if they are single particles, their random behaviour comes at the very centre of your concern and you are obliged to remember that matter is a statistical aggregate of randomly behaving individuals. The same is true, for example, if your subject is the diffusion of fluids. Even if the subject of your concern is the behaviour of fairly large aggregates it may be that your required measurements are so precise that this tiresome random element in the behaviour of matter is of concern to you.

If you are prepared to accept that a lump of matter is really an aggregate of randomly moving particles then I think you must also accept that a microscopically correct description of the lump of matter would be a statistical affair. Perhaps an analogy will help. Instead of considering millions of particles vibrating and migrating—which is difficult to describe—consider the simpler example of two dice being rolled, say, 360 times. There are, of course, thirty-six possible results of each rolling and, if the dice and the rolling are fair, you would expect to get each one of them about ten times in the course of the 360 rollings. But if you want to have a complete and precise statement of how likely is any particular outcome of rolling two dice 360 times (and there are a tremendous number of possible outcomes) you will need a statistician.

The second point which I think underlies all the examples of statistics being the basis and handmaiden of sciences concerns the nature of scientific propositions. I agree with Karl Popper about the philosophy of science. (I do however accept that there are occasions when a fresh hypothesis, which constitutes a step in scientific development, is so new and the step therefore so long that it is fair to call it a scientific revolution as did Kuhn. However that is not really relevant.) In the scientific process a period of making and organizing observations is followed, by the grace of an inspired scientist, by a new, integrating, explanation. That is followed by another period during which fresh observations are made and organized in order to try to falsify the explanation. As long as the explanation is not falsified it goes on being corroborated and the longer it goes on being corroborated the more it *is* corroborated. It can never be verified, however.

There are four kinds of proposition in the sciences. The first two are definitions and tautologies, which could be regarded as the names of the pieces in the game and the rules of the game. Many of these are mathematical and many others are simply giving names to things. These propositions are essential but they do not get us any further.

Then there are propositions which are single facts. A simple example would be, 'I tossed a coin and it came up heads.' A rather more complicated example would be, 'A millilitres of a solution of B milligrams of X dissolved in C millilitres of Y was administered by intravenous injection to D rats. E showed no response but (D-E) developed symptoms of Z.' A, B, C and D, E are numbers, X, Y are substances and Z is a disease.

Provided that you can accept the evidence of your senses and use the common names of things these are plain statements of fact; they are true and important but they too do not get us any further.

I cannot quite resist a tiny digression that to a certain sort of epistemologist these plain statements of fact are themselves probability statements. Wittgenstein and

Bertrand Russell argued for a whole afternoon about whether they could be *sure* that there was not a rhinoceros in the room with them. Russell thought that he was sure but Wittgenstein would not have it. The trouble is that you can never be quite certain that your senses are not deceiving you. However, as long as well-known tricks with drugs, hypnosis, mirrors or other perspective-distorting devices can be set on one side, the evidence of our senses can be accepted and 'I tossed a coin and it came up heads' can be accepted as a true statement of fact.

However it is not very useful, nor is the more elaborate statement about the poor rats very useful, on its own. What is useful is the fourth kind of scientific proposition. That is the generalized statement or hypothesis that the inspired scientist makes as a result of the series of single facts that he has observed. These are: 'There is a fifty-fifty chance of heads coming up when the coin is tossed' or 'There is a $(1-\frac{1}{n})$ chance of a rat developing symptoms of Z if it has an intravenous injection of A millilitres of a solution of B milligrams of X dissolved in C millilitres of Y'.

The basis for making these generalized statements is very dubious but that is another epistemological digression which does not really matter. Inspiration nearly always plays a part; the statistician's contribution, in specifying the legitimate ways of assembling and manipulating the single facts, is essential. Some people think it is sufficient in itself, but my own belief is that the really fruitful generalized statements also need a truly creative intuition. The generalized statements are hypotheses, fruitful as they stand because actions can be based on them. But they are beliefs, not facts. They are available for use and they are also awaiting falsification. The possible uses of the two examples I chose would be in gambling and in medicine. After their formulation industrious scientists will devise experiments aimed at falsifying them. Some of the experiments will be the actual uses made of the propositions. As long as falsification does not come then the hypotheses are gradually corroborated. All of these *useful* propositions in science are probability statements—even though they may be expressed in a sloppy way as if they were not—and their formulation and their subsequent handling call for the techniques of statistics. This claim is the very heart of my argument; it is so important that I will say it again. All of the useful propositions in science are probability statements—even though they may be expressed in a sloppy way as if they were not—and their formulation and their subsequent handling call for the techniques of statistics. The importance of the point about 'subsequent handling' is that subsequent handling of some sort or other is nearly always necessary in order to devise experiments aimed at falsifying the hypothesis.

I have been using simple examples which require only simple statistics to formulate and handle the probability statements, but even a very little elaboration will greatly complicate the statistics. Going back to those poor rats, the scientist could try various values of A, B and C and observe the various outcomes of D and E but he would be an extravagant scientist if he tried all the possible values. At some point he would start to estimate by interpolation and even extrapolation. And there the statistician again plays a central part.

I think I have justified my first claim. Let me move on to the second, that statistics is the basis for the control of all processes.

The basis of the control of processes

I am going to be so bold as to rest this claim on a single example. I believe that the

component actions of controlling processes are everywhere the same in essence so that the one example will suffice.

I hope it will not be too tedious if I spend a little time introducing a physical process which needs statistics if it is to be controlled. I have in mind a chemical reaction being made to take place on an industrial scale in order to produce some desirable product for sale. I also have it in mind that the reaction only takes place satisfactorily if the temperature of the mixture of the various compounds that are reacting with each other is maintained within quite a close range. In the real world of course it is likely to be necessary also to control the pressure and perhaps the acidity or various other characteristics of the mixture but those complications need not concern us. Nor does it matter whether the reaction takes place in batch mode or continuous mode—all that means is that it doesn't matter whether the reaction is taking place in a basin or in a pipe. Two things that do matter are that if the temperature goes outside the specified range the reaction is spoilt and therefore costs are incurred. Similarly to intervene in the reaction in order to raise or lower the temperature also costs money. Both events therefore need to be avoided if possible, and their frequencies certainly need to be minimized; that is what 'controlling the process' means.

Obviously the first thing is to make sure that there are instruments for recording the temperature of the reaction. There may or may not be a completely automatic link between the instruments for recording temperature and the devices for influencing it. Feedback is essential but it does not have to be automatic feedback. The heating or cooling devices can be controlled by a thermostat or by a switch as long as there is provision for dealing with variation. Someone has to decide when to intervene to raise or lower the temperature; the rules for doing so can be embodied in the thermostat system or they can be written down in a book of instructions to be followed by the operator. They must be designed so that the costs of the process are minimized.

In a perfect world it might be that the rule is very simple, it could be of the form. 'If the temperature goes above X switch on the refrigerator and if it goes below Y switch on the immersion heater.' However, even such a simple rule depends for its operation both on the appropriate choice of how often to measure the temperature and on the appropriate choice of X and Y. In turn these depend on various characteristics of the system, such as how rapidly the temperature of the reaction goes up and down and how long it takes for the fridge or immersion heater to become effective. On top of that there will be errors of observation brought about either by defects in the instruments or by human imperfections, and there will be real but random fluctuations in the behaviour of the reaction. The sources of these random fluctuations will include variations in the quality of the ingredients put into the reaction, variations in the environment outside the reaction and even truly random variations in the behaviour of the molecules involved (That stems from the tiresome random element in the real nature of matter that I have already mentioned.) The same may well be true of the speeds at which the instruments and the fridge and the immersion heater perform.

Let me just confine my attention to the temperature of the reaction because all the other fluctuations can be dealt with by the same sort of technique. The temperature of the mixture of the various compounds that are reacting together goes up and down. We need a description of that variation of temperature in order to decide how

often the temperature should be recorded and at what temperatures we should intervene. The pattern of variation will not be fixed, it will be random, like the outcomes of rolling dice. However it can be described in terms of probabilities. The description would go something like this:

Starting from the temperature of the reaction at one moment there is a certain chance—say, one in a hundred—that the temperature at the next moment will be so many degrees lower, there is a certain other chance—say, two in a hundred—that it will not be quite so many degrees lower, there is a certain other chance—say, three in a hundred—that it will be even fewer degrees lower; and so on, going on through perhaps ten chances in a hundred that it will be the same, and eventually to, say, two chances in a hundred that it will be so many degrees higher and, say, one chance in a hundred that it will be so many degrees higher than that. In the whole description all hundred chances would be precisely used up.

Of course all that could be expressed a good deal more elegantly with the use of algebra and probability notation but I thought that I would spare you that.

To design the observations that would lead to that description of the temperature characteristics of the reaction is, of course, a statistical exercise. Equally, to deduce from that description and the cost characteristics of the reaction what are the best rules for intervening to influence the temperature, is a statistical exercise. Feedback and control are impossible in the real world without statistics.

Statistics and evolution

I am not a biologist and some of what I am going to say may be not strictly accurate but I believe it is correct in the essentials. I think I should also apologize in advance in case I have misused other people's jargon.

I need to start with a few words about the straightforward evolution of living things. Given a starting condition of the world, or part of it, with various populations of plants and animals in, or approaching, balance with each other, some change takes place. The change may of course be nothing to do with life, it may be volcanic, geophysical or climatic. Such changes, quite external to the universe of life, are certainly important in the history of the world but I do not propose to deal with them. The other sort of change is a random genetic mutation leading to the birth of an individual member of a species which is different from its predecessors. Nearly all of these mutations are failures in the sense that the individual is grossly inadequate to deal with its environment. Consequently the individual plant or animal quickly dies. But, rarely, the mutation is successful and the individual is better able to survive in its environment. If that happens, and if the new individual is capable of breeding, then its offspring will also survive better than others and in time the whole population of that species (which is really of course slightly changed as a result of the mutations) would come to have the 'new' characteristic.

The process I have described is almost completely mindless and unplanned and it was that of course that made it so repugnant to Darwin's contemporaries. What he described was mutation completely at random having an outcome which appeared purposive as a result of its interaction with selection by 'survival of the fittest'.

I believe that all that is now fairly well corroborated and is even acceptable to many modern theologians. What follows is much less well corroborated; indeed it is really no more than speculation. It concerns a second major phase of evolution which began when, as a result of the first, automatic, phase of evolution, a recognizable near-human creature came along from amongst the apes. The key change took place in brain capacity. Up to this point the control mechanisms of animals and plants were adequate to respond to environment. Petals closed in the dark and opened in the light; heartbeat slowed in the winter, etc. The creatures *merely* behaved accordingly. They were not much different from a well-developed chemical process with appropriate automatic feedback and control rules. That indeed is what they were. But at some point an ape-human was born with more capacity in its control mechanism (brain) than was strictly necessary for automatic feedback and control of surviving and breeding. Quite soon the spare capacity in the brain turned to self-examination and the human became self-conscious. It could observe its own behaviour being controlled by its own feedback devices and it could consider whether those responses were really most suited. It could also, of course, observe its environment and consider whether it was appropriate; if not, it could consider moving to another environment. Quite soon I suspect it began to consider its own desires and aspirations. At this point its evolution has come to quite an extent under its own control. The human could, and did, consider what sort of individuals would best serve its aspirations in the environment that was likely to be around, and could favour the mutations which suited those. The human could protect its offspring from unfavourable aspects of the environment so that it could survive to further its parent's aspirations. Up till now (1979) humans have not found a way of controlling the mutations themselves; they have to be taken for granted and used as well as possible. A bridge-player—or one who does not cheat—takes the hand dealt by a random process but makes the best of it. It is, I think, offensive and unromantic to suggest that falling in love has anything to do with deliberate selective breeding.

I now move on to something even more speculative concerned with social evolution. Until fairly recently, forms of social organization have developed in a way strictly akin to the way in which individuals evolved in what I called the first phase. Social organizations existed from early in the history of life; some plants and many insects live in groups in which the individual members depend on each other's behaviour for surviving and breeding. There is of course nothing strictly analogous to the genetic mutation which starts off the process of evolution for individuals—at least I do not think there is. But in any case it is of no consequence for my purpose. What does matter is that in the first phase of social evolution a change in social organization takes place, unpredictably and outside the control and will of the members of the group. If it turns out to be a successful change then that new form of social organization will thrive. The process will appear purposive as a result of the interaction between the chance change in social organization and the selection by 'survival of the fittest'. This phase of social evolution is, like the first and unself-conscious phase of individual evolution, not planned or willed by the evolving group. It led to such things as ants and bees. But fairly recently—say in the last three thousand years—something has happened to make possible a planned and willed phase of social evolution. The event which moved social evolution from its first phase into its second was the discovery of the technique of observing the structure and behaviour of the

group, in the same way as the development of excess capacity in the brain of the ape enabled it to observe its own behaviour, become self-conscious and be a human.

I think it must be clear by now where my speculation is leading me. The behaviour of the individuals comprising a group, especially if they are humans, has a substantial random or at least unpredictable element. The techniques of statistics can and do enclose and digest that random element into a regular and predictable pattern of group behaviour.

It is strictly akin to the physical sciences. Eddington had his 'scientific' table consisting of an unthinkable number of molecules each behaving in a random way but as a group behaving as a table. Similarly the individual members of the population of, say, Britain behave in a random manner but as a group behave with a certain amount of regularity.

There are two critically important differences. The first is that molecules are not self-conscious and do not have aspirations, whereas human beings do. Consequently the random element in the behaviour of molecules is much smaller in relation to their total behaviour than it is with humans. Secondly the numbers are far smaller. In Eddington's table there would have been something like 10^{25} molecules whereas the whole population of the world is only 5×10^9 . Consequently, it is far more difficult to discover regular patterns of behaviour by human groups than it is to do so for lumps of matter.

These two important differences must not be forgotten when considering the roles of statistics as the basis and handmaiden of all the sciences and as the basis of the control of processes. In those sections of this paper I confined the discussion and the examples to physical sciences and physical processes. I could have extended them to deal also with the social sciences and social processes but my paper would then have become too long.

Very briefly, statistics is the basis and handmaiden of the social sciences because societies—the subject studied—consist of individuals whose behaviour contains a random, or at least unpredictable, element which can only be handled by statistical techniques. Consequently, general, and therefore usable, propositions in the social sciences are, strictly, probability statements. They therefore need statistical techniques if they are to be manipulated in order to use them, to devise experiments or fresh observations aimed at falsifying them.

The very phrase 'controlling social processes' carries repugnant overtones and I would have liked to avoid it if I could. In truth, however, anyone who has responsibilities for the welfare of a social group (which may be as small as a family or as big as the United Nations) is obliged to 'control social processes' whether or not the name of the action is repugnant. Controlling social processes depends on rules about the circumstances in which intervention is appropriate and economic. The formulation of these rules depends on statistical observations and analysis even more clearly with social processes than with physical processes. The random variations in the behaviour of the components of a physical process are far smaller than the variations in the behaviour of the components (equals people) of a social process. Indeed on the basis of this difference many people argue that any attempts to control social processes are not only doomed to failure but are positively pernicious.

I do not. Being a government statistician I could not. But I do accept that the number of individuals in human populations (tiny in relation to the number of atoms

in lumps of matter) and the variability of their behaviour (gigantic in relation to the variability of the behaviour of atoms) mean that we statisticians are at full stretch in these applications of our craft. We undoubtedly have a contribution to make but we must be humble about its power.

In spite of that, or even because of it, statistics is an active force in society, in manufacturing and in science. And my life has not been mis-spent in practising it.

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Quality and quantity of information

M. F. Chaplin

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I WAS DELIGHTED to be asked to address this conference, because its theme—the economics of information—and, indeed, the contributions from other speakers, place information in the context of an important and valuable resource. There are two additional reasons for my delight. Aslib's invitation to me confirms its interest in the information problems of the construction industry. Also, whatever experience I have in the information field is as a user of information; I believe I can add to the concept of information as a resource and help the movement away from the idea that information providers see the production of information as an end in itself, regardless of the end user or how the information will be used.

I am going to describe the studies initiated by the Department of the Environment aimed at achieving more effective use of information by the construction industry. The economics of information has been an important aspect of this study. Many people have little experience of the construction industry except either as occupants of dwellings or the buildings they work in, or perhaps occasionally engaged in the exasperating task of actually having building work undertaken, so I will begin by describing briefly how information fits in to the activities of the industry.

The construction industry and its use information

The construction industry is a prodigious user and generator of information: it needs to have information about the materials and products it specifies and uses. Building work is controlled by regulations and similar requirements and this gives rise to a considerable volume of information. It makes extensive use of standards and codes to define and control the quality of design and workmanship. In such a diverse industry there is a considerable amount of published guidance on matters of design and building techniques coming from a variety of sources. In addition there is a large volume of data on costs. A characteristic feature of the construction industry is the physical separation of those responsible for the design of buildings and those engaged in carrying out the construction process; this generates information and, indeed, the design activity is largely one of distilling information and reproducing it in the form of drawings, specifications, schedules, etc. These documents form the principal methods of communication from designers to contractors and specialist firms, enabling them to determine a price and construct the buildings.

The characteristics of the industry

I have already referred to the diverse nature of the industry; this applies not only geographically but also to its structure. This diversity is also important to an understanding of the way information is produced and used and the problems it poses.

In the majority of building projects, those responsible for deciding the requirements are not directly connected with those who carry them out. In the first category there are architects, engineers, surveyors and several other similar groups. They are employed by central and local government and in private practices. On the contracting side of the industry there is a similar variety of specialist groups ranging from general builders to firms of electrical contractors, plumbers, heating contractors and so on. In both cases there is a relatively small number of large firms but a substantial number, by far the majority, of small organizations. Even the large organizations are invariably broken down into a number of smaller units and dispersed around the country.

Types of information*Product*

Information providers are equally diverse. Building material manufacturers produce information about their products on a massive scale. It is said that the industry uses half a million different items and there must be several thousand manufacturers providing catalogues or leaflets. Some semblance of order exists because there are reference documents cataloguing a large number of these items and there are also four commercial product data systems available to the industry although they are by no means comprehensive in their coverage. There is also a British Standard dealing with the format of such information but the extent of its use is limited. As you can imagine designers and builders face an almost bewildering choice of products and have to rely heavily on manufacturers, product data services, technical magazines or Building Centres for their information.

General

In the field of general information, which covers techniques and methods as well as standards, there is also a wide variety and a considerable amount of overlap. Most of this type of information comes from research organizations such as the Building Research Establishment, the Cement and Concrete Association, the Timber Research and Development Association and similar bodies. There are about thirty information providers of this sort counting professional institutions and similar associations. The British Standards Institution is mainly concerned with standards and codes of practice. There are probably 1,500 of these which touch on construction matters and the average practitioner will find that at least a third require frequent reference. To buy these standards would cost around £2,500 not including the frequent revisions which are published continuously and the smaller firms are often unable to afford this level of expenditure. This situation regarding cost is not confined to the purchase of British Standards only.

Project

The production of drawings, specifications, schedules and bills of quantities, an area

of information we call 'project information', is perhaps less confused, as for some years there have been information standards and conventions which the industry observes. There is a British Standard covering drawing techniques and symbols. Another standard developed by the industry itself, covers the rules of measurement and the presentation of this information in bills of quantities. Specifications also follow agreed conventions and there is a National Building Specification for use as a source document. It is not difficult to appreciate that if the communication process is to be effective, it is essential for drawings, specifications and bills of quantities to be co-ordinated, yet in most cases the basic standards are not compatible largely because they are produced by different organizations with conflicting interests.

Problems facing the industry

The features I have just described made up the scene as the Department and the industry saw it some three or four years ago. No great insight was required to realize that if some degree of improvement and co-ordination could be achieved, major economies and higher levels of efficiency could result. Considering that the average designer spends between 30 and 40 per cent of working time searching for and assimilating information, the room for economy and greater efficiency is quite large. But even with this scope for improvement there are some fundamental problems to be overcome.

Information is not seen by those working in the industry as a primary factor in their activities. Explain to architects that one of their principal roles is as communicators of information, and they will deny this or at least see it very much as a secondary function. Similarly, get contractors to acknowledge that the efficiency of their operations, and ultimately their profitability, depend on receiving a co-ordinated package of drawings, specifications, etc and they will talk about management and trade skills as being the primary concern. There is a lack of awareness of the importance of information and an equal lack of understanding of, or perhaps even disregard for, the economics of information practice. The provision of better information facilities and the part they play in the design and construction process are not seen by the majority of organizations in the industry as critical issues. The proliferation of information, much of it freely available, may in itself have contributed to the problem, in that the average user does not appreciate what might be done or see the importance of information as a cost factor.

Furthermore, improvements in information systems or techniques at one level often bring benefits, not to those who finance and install the new procedures, but at a lower level down the chain. For example, the contractor is likely to benefit most when an architect introduces new techniques for the content and structure of drawings. Paradoxically if this is reflected in a lower price for the project because the contractor recognizes the communication process will be easier, the architect will suffer financially because fees are based on a percentage of the project cost.

External factors

Having made these points, however, and perhaps in doing so being guilty of overstating the difficulties the industry finds itself in, I am by no means pessimistic about the

future. Changes are taking place, and the work of the Department in the information field has revealed a willingness to co-operate on the part of the representative organizations and information producers which did not exist seven or eight years ago. There is little doubt that external factors are having an influence

The first of these is the question of cost. I have already touched upon this, but I want to highlight the fact that the production of information, its dissemination and use are becoming increasingly more costly and as a consequence the cost factor is impinging on users in a new way. Manufacturers producing information on products are becoming selective in its distribution and in certain cases are charging for catalogues which up to now have always been provided free. Other information producers are recognizing that they can no longer afford to have overlapping interests, and see the need for closer co-ordination.

The second factor is the growing interest in computerized information systems which in turn demands a more disciplined and co-ordinated approach to the way information is presented. Agreement on vocabulary control, the selection of key words and indexing are obvious examples. There is little doubt that viewdata systems have a major role to play in the construction industry as has similar microelectronic technology dealing with information storage and retrieval.

Current activity

Both of these factors featured in the results of the Department's study of information. As the conclusion to this paper I should like to describe what action is now being taken to improve in a gradual way the information practices of the industry.

In the field of product information, I am pleased to say that manufacturers and the product data services are now showing much more interest in compiling information along the lines of the British Standard. This measure of rationalization leads to an all-round improvement and has both long and short term benefits.

The results of the work on general information are equally encouraging. We are certain there will be continuing collaboration among information providers. If the necessary funds can be made available, it is proposed to undertake a trial designed to achieve better regional integration of information resources including public libraries, libraries of technical colleges and universities, as well as similar facilities in large organizations such as the DOE Property Services Agency. The aim is to provide a better and more comprehensive information service to smaller organizations in locations which are not close to professional institutions and similar centres with facilities to provide such a service. A reference service accessed through a viewdata system could have a part to play in such a trial, but in addition we intend to provide a number of reference publications designed to match user requirements. The thinking behind this is that experience has shown that a large proportion of enquiries on construction matters can be met from a relatively small number of reference documents. If specialists and users working together can determine the content of these documents, then they can be held in libraries for general reference purposes. On a more general basis it is felt that the use of information standards is just as applicable to the presentation of technical guidance as to product data and it is hoped that the experience in the latter field can be transferred to the former possibly through the medium of a British Standard or code of practice.

The construction industry is fortunate in having developed a thesaurus known as the Construction Industry Thesaurus (CIT). This service provided by the CIT Agency is becoming more widely accepted as a means of vocabulary control in British Standard glossaries and in other standard documents used by the industry. It is also a means of agreeing upon key words for indexing purposes and has provided the way forward when co-ordinating information for the viewdata system the Department is sponsoring as part of the Prestel project. We are calling this CONTEL and it aims to make available for the construction industry a reference data bank covering regulations and statutory requirements, standards, technical guidance, product data, building and maintenance costs as well as a news service and a diary of current events. Within the system we are attempting to make the searching of information as simple as possible and it uses both an alphabetical index as well as a structured one relying on commonly used key words. Whilst we acknowledge the limitations of the system, nevertheless it is an example of collaboration by the twenty or so principal information providers to the industry. Although at present it is simply a trial, I believe it provides a good indication of the way information will be handled in the future.

There is also collaboration taking place between the principal bodies involved in the production of project information. At last, co-ordination of drawings, specifications and bills of quantities looks like becoming a reality and in time the industry will benefit from the adoption of more standard practices for the production of these documents.

Another important area is in the field of education and training on matters of information. The committee advising the Department saw this as a crucial item because up to now the processing and use of information has not been taught in any formal sense to students in universities and technical colleges training to enter the industry. Some structured approach was felt desirable and in conjunction with educational bodies and the various institutions, detailed proposals have been worked out by Strathclyde University under the direction of Michael Munday. It now remains to get these ideas incorporated into the various teaching syllabuses and although this will not be easy, the ground-work has already been laid. For practitioners we saw the need for authoritative guidance on current information practices and a comprehensive handbook is due to be published by H.M. Stationery Office later this year.

The future

Much work still remains to be done if the construction industry is to improve its information practices. The present economic situation is not particularly helpful. In the construction industry where there is much public sector involvement, past governments have taken the initiative and provided funds when new ideas are being introduced, but the practice for the future seems more likely to follow that adopted for the CONTEL project where the Department has 'seeded' the initial project, leaving it to industry to take up the results on a commercial basis.

No matter what the future holds I believe sufficient interest in this subject has now been aroused for further progress to be made. Although the Department, with its long involvement in information matters, may find it necessary to play a less prominent role, we are hoping that in its place the National Building Agency can establish itself as the focus for co-ordination and continuing work in this field. I would like to

conclude with a quotation from G. K. Chesterton which very aptly summarizes the requirements of the construction industry, 'To have a perfect system is impossible; to have a system is indispensable.'

Discussion

SESSION 3

Paper 1 John Page.

J WILKINSON (University of Surrey) The basis of our discussion on economics is a relation between cost and benefit and your paper largely discussed the cost side. What interested me particularly was your comment on the political motivations. This often means a somewhat more expensive system but with a correspondingly bigger benefit and some measure of this should appear on the credit side of the costing although goodness knows how you arrive at it. Would I be correct in assuming that these were basically marginal costs? Governments generally don't charge their capital costs—they write them off as they go along and they don't charge for the infrastructure which supports these systems because it is there anyway. This often makes the international system more expensive because the infrastructure has to be created.

PAGE The unquantifiable benefits of international political co-operation are almost impossible to take into account. One can describe them in words and then make a judgment. For example would it have been better for several European countries to join together to set up a data base in opposition to that of the National Library of Medicine with the resulting delays and high cost, in preference to the existing co-operative system which confers great benefits at the cost of loss of know-how?

F BLAMOUTIER (CNRS, France) In your comparison have you taken into account the difference between multilingual systems such as TITUS and monolingual systems such as INIS? The intellectual effort is quite different in each case. Secondly, with the supermarket approach one has to consider both the commercial distribution system and the size of the data base. Economics of scale help to reduce distribution costs but not compilation costs of the data base or data bank. It is important to keep the contact with the user and this is easier with a smaller but very specific data base.

PAGE: Certainly the figures for TITUS compare very favourably with those for the monolingual system but this may well be because TITUS is an unusually efficient operation and one cannot deduce a general rule from these figures. On the second point, I agree, if you run a small, easily managed data base and the computer can also be used for other things, you will probably be able to provide a better and more effective service to users and this is probably not quantifiable in terms of cost.

D KILLEN (National Library of Australia) You mentioned alternatives to the supermarket approach. I'm interested in what you think these alternatives might be in Europe. Are we going to see a number of Euronet hosts endeavouring to enlarge their customer base, are we going to see them diversifying, or are we going to see a continuation of subsidies as at present?

PAGE. Subsidies will certainly continue because a number of countries have set up organizations especially to become hosts on Euronet and these organizations will not be economically viable in any case for a few years. How long this will continue in the present financial climate is anyone's guess. There will be an element of competition but the final picture will depend on the financial resources of the governments concerned, not, I should stress, the EEC, who are unlikely to provide subsidies for

hosts. They may offer help of some kind or other to set up new data banks, because the EEC believe that if there were many more data banks the hoped-for explosion in the customer base would occur

Paper 2 A Boreham

K J CLACK (Blackwell's): 10 per cent of all road accidents are caused by drunken drivers. Would we not, therefore, save more lives by banning all sober drivers? In view of the possibility of misinterpretations of this kind would you not agree that statistics are a false handmaiden and faithful only to those who wish to be unfaithful?

BOREHAM. Yes, statistics can be abused and I regard it as one of my functions to try to reduce the amount of abuse that goes on. However, the fact that something can be abused must not be used as an argument for minimizing it or abolishing it.

T CULLEN (MAFF). There is some statistical evidence which shows that if two groups of scientists set out, one to prove and one to falsify a hypothesis, the group trying to falsify it will obtain better results in support of their argument than the other group. How would you interpret that?

BOREHAM. Experiments must be done in public and must be repeatable, otherwise they don't count. They might count for a time or in a particular political environment, but in the end they have to be disregarded.

CULLEN: I was thinking of a piece of work reported in the *New Scientist* which showed that, in general, 'optimistic' scientists usually obtained results supporting their hypothesis while 'pessimistic' scientists didn't.

C. OFFOR (Warwick Statistical Service): I would like to ask a question about the GSS. You said that its primary purpose was to provide a statistical information service for government. A number of countries have statistical services which seem to have interpreted their role more broadly and provide statistical information to the community. Some countries like Canada have moved quite a long way down this road and I wonder if you can tell us something of your own views of the future of the GSS in this context?

BOREHAM: I'm sure I said it was the *main* function of GSS to serve government but I, and indeed the government, accept that it is a second and important role to serve parliament and the community generally. How far this will go in the future I do not know. Almost certainly the main function will continue to be to serve government. I hope that the GSS will continue to develop its present services to the community, e.g. publications like *Social Trends*. You could argue that there is no reason why the kind of verbal analysis found in *Social Trends* should be done by the GSS. It could be done by anyone—the figures are all there. But a good reason for the GSS doing it is that one can only control the quality of the statistics one produces by analysing them and interpreting them, and for this reason we should go on doing it.

Paper 3 Chaplin

S. HAYNES (Ministry of Defense). Surely in your industry the most important thing is to get information back from the bricklayer to the architect and the supplier. Have you looked at this particular problem?

CHAPLIN: Not quite in that context in but in another one. Many of you are aware of the publicity which has been given to defects in buildings which have occurred over the last few years. The government would like to encourage measures by which the quality of work undertaken by the industry could be improved. So a number of organizations have set up feedback systems, feeding back experience of performance in use to those who have to design and maintain buildings. The communication between the craftsman and the designer is not good. Sometimes one can cure a persistent fault only to see it reappear ten years later with a new generation of designers and architects. The problem is one of education and, of course, information. The Building Research Establishment is now engaged in trying to analyse the communication process between designer and craftsman and with the construction process itself. The level of comprehension is quite different at the craftsman level. Architects produce drawings and instructions which satisfy themselves and their colleagues but which are all but useless at the craftsman level and this is something that has got to be remedied.

G C ATTENBOROUGH (Hatrics): How will all this connect up with the small firm? It is very difficult to convince these small organizations that they need information, other than that which they already have. They are remote from professional associations and the like; they do not read a great deal of literature and often rely on product information files which are woefully out of date. How can we convince them that information is not just a layer of unwanted complexity in their lives?

CHAPLIN: This is the real nub of the problem. It is the smaller organizations at which we should be aiming. I hope that the trial which I mentioned in the North East of England will be useful in this respect. I think that viewdata systems may offer a possibility because the television receiver itself is a familiar item of use and the people in small firms seem keen to use the system.

M SILVERSTON (Camden): When you have the trials in the North East will you be putting detailed information on Prestel or will you use it as a kind of index to information already available in books and other publications on building subjects?

CHAPLIN: At the moment it is a referral system showing where information may be found. The level of information does concern us and at present we see it as a means of getting people interested in the subject, but we would ultimately try to provide more detailed information.

How much good does your library do?

John Blagden

Cranfield Institute of Technology

Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

THIS CONFERENCE SESSION is to be devoted to the value of information as seen by the customer, but ironically all of the session's speakers are in fact intermediaries in the information transfer process. We cannot therefore speak from first hand experience, but what we can do is to talk about our experience based on the systematic analysis of customer contacts.

There are of course many problems in talking about customers, and let me highlight a few.

- (i) The word customer, like user, is misleading in that it appears to restrict this session to those that actually use our services whilst what I am concerned with are all those people at whom the service is aimed.
- (ii) This target audience needs to be defined both in numbers and type, i.e. segment the total 'market' that the library is attempting to reach. The problem here is how it should be done.
- (iii) Some customers may be regarded as more equal than others, not only in terms of seniority or status, but also because some groups rely more heavily on documentary information than others. In this connection our goal as library and information managers is to develop an information utilization strategy *à la* McLuhan¹, whereby we see the differing sources and methods of transferring information (oral/written, published/unpublished, informal/formal, external/internal, etc.) as complementary rather than competitive.
- (iv) Another difficulty often expressed, but, as far as I know, somewhat under-researched, is that we cannot necessarily assume that what customers demand is what they necessarily need.
- (v) Can we also assume that customers' requirements and the goals of the organization that funds the library that is serving them are necessarily in complete harmony? If not, how do we reconcile these differences and at whose expense? Let me give you one example of this problem of customer/corporate disharmony. I was a manager of a library service giving information support to consultants engaged in top management problem solving. The firm had an up or out personnel policy. Up meant promotion and out meant dismissal. We had a very enthusiastic consumer of library services who absorbed a disproportionate share of library resources, who was always singing our praises to the partners of the firm. All very well, except this chap soon entered the out category.

- (vi) Even if customer requirements and corporate goals are in complete harmony, how does one reduce ineffective use of the service, i.e. how does one get into the library system customer and corporate feedback which ensures that the system is a dynamic one?

If one looks at this question of effective customer usage a little further then Table I, taken from Tom Allen's book², is one that appears particularly relevant.

TABLE 1. *Comparison of time allocation among four activities by higher- and lower-rated project teams**

	Percent of total time allocated		
	Total for twelve development projects	Four higher-rated projects	Four lower-rated projects
Analysis and experimentation	77.3	77.9	71.4
Literature use	7.9	5.0	5.3
All communication (including literature)	16.4	13.9	13.4
Other activity	6.3	8.2	15.7
Total time reported (man-hours)	20,185	6,566	7,975

* The Allen data is based on project team performance so that it could disguise high individual literature use correlated with high individual performance

Certainly high and low performers working in the research development environment appear to spend the same amount of time on published information. Does this simply demonstrate that the good technologists use information effectively and that therefore the key factor in how beneficial a library is are the customers themselves? I suggest that the unknown factor here is how far the library manager can influence this situation.

Most ways of assessing the performance of a library tend to duck these questions and assume that like document exposure^{3,4} all library use is beneficial. Library justificatory data based on user time savings also assume that all use is beneficial. In addition, there are methodological problems here of how the time savings are established although at the Greater London Council (GLC) we did attempt to do this in a novel way⁵ by simulating the conditions that would apply if the library didn't exist. Attitude surveys too have their weaknesses in that people do not appear to have very sharply defined attitudes to libraries. One therefore requires a very sensitive and reliable instrument to bring them out. The Hillingdon Study⁶, for example, on which great care was taken to get the methodology right, appeared to show that there weren't very significant differences in attitude between library customers/noncustomers and book buyers/nonbuyers. I'm uncertain, anyway, as to whether even reliable attitudinal data of the generalized sort are really a good indicator of a library's performance.

Another performance assessment assumption is that a library can be judged by the amount of resources put into it. The Clapp Jordan formula⁷, the Department of Education and Science (DES) and Chartered Institute of Public Finance and Accountancy (CIPFA) statistics on both university and public libraries are examples of this, where customer impact is conspicuous by its absence.

My view then is that we have to pursue the question of customer benefits and at the GLC and British Institute of Management (BIM) we attempted to do this, evaluating

how well the library was getting through to the customers at whom the service was aimed;

what impact the service had on those who were exposed to it

Market penetration was plotted simply by recording all use over a four week period and then matching this with the audience that we were attempting to reach. We measured penetration in a number of other ways and in my view in both libraries penetration was poor. Let us have a quick look at these three tables to see whether you agree with me or not, because poor is an entirely subjective notion. In Table 2, we used a theorem developed by B. C. Brookes⁸ to correct the data because in a straight four week period you pick up a disproportionate number of heavy users. In Tables 3 and 4, we were also able to use some previously published data⁹ which indicated that architects engaged in design required product information daily. We therefore had a rough idea of the number of product based design decisions that were being made and we compared this against our corrected four week usage data

TABLE 2. *Penetration analysis by numbers of personnel reached*

	Numbers of access users* in four weeks	Total target audience	Percentage penetration for four week period	Total percentage penetration
Architects	171	538	31.8	75
Quantity surveyors	44	263	16.7	25
Structural engineers	17	119	14.3	22
Civil engineers	18	129	14	64

* Design staff only

Penetration in terms of the BIM was also poor, but here you have a different type of library which will frequently be used on a last resort basis. Impact was assessed by showing samples of the recipients documents that they had borrowed and returned. We found this technique very useful as interviewees were able to recall quite vividly the circumstances surrounding that particular information-seeking act. As Table 5 shows, managers appeared to gain considerable benefits from using the BIM's Management Information Centre.

In the interviews that I conducted managers appeared to use publications much more for problem clarification than problem solution. I also discovered that asking

TABLE 3 *Penetration analysis by number of contacts with service*

	Number queries posed in survey period	Optimum incidence of product information decision-making over four weeks*	Percentage penetration for four week period	Annual number of queries likely to be posed	Annual optimum incidence of product decision-making	Annual percentage penetration
Architects	371	5,557	6.7	4,693	70,296	6.7
Quantity surveyors	87	1,014	8.6	1,101	12,827	8.7
Structural engineers	30	106	28.3	380	1,338	28.3
Civil engineers	28	275	10.2	351	3,485	10.2

* Job personnel only

TABLE 4 *Penetration based on work activity (architects only)*

Annual number of queries likely to be posed by housing architects	Number of jobs at two peak information gathering stages*	Number of jobs at working drawing stage	Annual optimum incidence of decisions based on 351 total	Percentage penetration 351 total	Annual optimum incidence of decisions based on 138 total	Percentage penetration 138 total
2188	351	138	70,902	3.1	28,876	7.6

* All jobs after preliminary feasibility stage including jobs in construction.

TABLE 5. *Benefits of searches—last use of BIM*

Manager rating	All forms		Books*		Newpapers*		Journals*		Other pubs*	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Highly relevant	121	48	77	60	6	55	28	52	34	51
Relevant	81	32	34	27	4	36	22	41	24	36
Marginally relevant	42	17	17	13	1	9	4	7	6	9
Irrelevant	10	4	0	0	0	0	0	0	2	3
Total	** 254	101	128	100	11	100	54	100	66	99

* Questionnaire responses were often of a multiple form nature, i.e. one search but more than one form indicated for that query, hence the books and other form totals are greater than 254.

** Includes searches where more than one publication supplied which were not broken down by form

questions about reading was more threatening than I imagined. There was on one hand the manager who was clearly reluctant to admit that he read at all because my impression was that if he admitted he read he was also admitting to being less dynamic than his colleagues. My evidence for this view was that under his desk he had a brief case literally bulging with management journals. Conversely, there was the personnel officer who didn't read, but felt very guilty about it and perhaps this attitude also influenced her responses. One final point—no significant differences were found between different management functions and certainly the BIM study demonstrated, as Rosemary Stewart did some time ago¹⁰, that the differences between managers, certainly in terms of the amount of time spent on reading, were much greater than the similarities. We may therefore need a different classification in order to segment managers, perhaps based on the kind of classification that Rosemary Stewart again has produced in her later work¹¹.

I have only given a broad outline of these two studies and certainly the GLC study has been reported in more detail elsewhere¹²⁻¹⁴. What emerged however was that both libraries appeared to be reaching only a relatively small proportion of the audience that they were attempting to reach, but that those that did use it generally gained considerable benefits from it. The uncertainty here is whether or not the GLC/BIM data are reliable even for those two libraries, in that, if the studies were replicated, would we obtain similar penetrative and impact data? If they are reliable for these two libraries, are they something that we can say apply to other types of libraries?

I am afraid that I seem to have asked far too many questions and provided far too few answers. However, that may be a fair reflection on our current state of knowledge about our customers—if it isn't, I'm sure the other speakers will put me right.

What I hope we would all agree upon is the need for more research in this fundamental area. Certainly at Cranfield we are hoping to attract librarians who are interested in library performance assessment research (and who may also wish to enhance their qualifications) to our Social Policy Unit¹⁵. In my view there is only one route that research can take and it is the route of establishing exactly what value customers obtain from information. Whether we will be able to put a money figure on that value is I believe still more of an open question.

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Information and the academic community

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THE BRIEF GIVEN for this paper is that it should be a personal view about what is good or bad in my experience in information service provision, the quality and value of various services. I have taken these to be secondary services as they are normally understood. This has left me with a two-fold problem. Firstly I have little constructive to say about such services, good or bad, which has not already been said far better elsewhere and secondly, though technically the customer for these services, I am not the end user of the information provided.

I have therefore chosen to look at the topic from the point-of-view of the university scientist. Not now being a practising research chemist I did not feel in preparing this paper that I could speak for this group of users without speaking to them. To that end I have had informal discussions with my academic colleagues. The approach was not systematic, the sample was not a proper one, and no structured questions inviting preconceived answers were asked. What I have to say therefore is disjointed, dealing with topics and points raised in those discussions. The content of this paper will be low level, i.e. it does not contain anything new or revolutionary; it will not be sophisticated, and indeed it may be naïve. This need not necessarily be a bad thing. It is often too easy for enthusiasts to get carried away with their enthusiasm, too easily dismiss the perceptions and doubts of others less knowledgeable or enthusiastic than themselves and too easily discount the more wary or slower to change.

Before moving on to the comments made by users it is necessary, briefly, to set the scene and consider the information backgrounds of these users. I should point out at this stage that I am ignoring the largest group of users of an academic library, the students, and concentrating only on research workers. What can be done for researchers though is obviously affected by what needs to be done for students. I am therefore considering the use of information by university scientists in their role as researchers, not as teachers, though the two cannot easily be separated. From discussions it emerges that university scientists are relatively unsophisticated users of information services, including the library, using them by and large only when they have to and then not at all well. Generally they will not expend too much energy seeking information, though they are often unwilling to delegate that searching. They are faced with too much information and tend to read or seek only that information for which they have time. They are conservative in habit and do not accept change readily. They will however accept advice. Librarians in the university, in the context of servicing research, have a somewhat different role from their industrial counterparts.

The unsophisticated use of information arises, I think, from another difference between the two environments, that is, that in universities immediate access to information is rarely necessary. Research in universities is less mission-oriented, less concerned with deadlines, less concerned with cost effectiveness. However, times change . . . How much the value of university research will be questioned in future is open to speculation.

The library, in providing for their needs, cannot and should not provide all the primary material that is required. The users would not read it if it were provided. The library must therefore make use of printed secondary services in an attempt to make use of the primary material easier. Again it cannot and should not provide all of these secondary services but it can provide alternatively and additionally on-line facilities. Scientists are well aware of the vast amount of primary material available to them and are daunted by it. They are equally daunted by the vast number of secondary services available to them. To meet this problem by providing current awareness services internally is neither justifiable economically nor is it demanded. Some externally produced current awareness services are purchased, though often as an insurance policy rather than as a necessity. In this case the individual or group is making a value judgement, taking into account the respective needs, since it is the individual or the group that pays for these services.

The limitation in scope of some major abstracting and indexing services in coverage of non-periodical literature has been brought home to many users with the increased use of on-line facilities. Whereas scientists would very rarely consult more than one secondary service when doing a manual search, we, in consultation with them, have often used data bases in doing on-line searches which they themselves would not have used manually. This has enabled us to stimulate more effectively consideration of report literature and patents as valuable information sources. It is unfortunate that at a time when we are trying to stimulate an interest in patents, the British Library is at the same time apparently trying to decrease their regional accessibility.

Experience of the use of on-line services has caused comment about the non-standardization of terminology employed in indexing of the different data bases, which of course include the printed abstracting and indexing services also. This is considered to be a hindrance to their use because of the extra pre-search effort required to formulate a search strategy or the inability often to transfer a search strategy from one data base to another. Even the comprehensiveness (i.e. non-selectivity) of data bases is called into question. Very serious value judgements are obviously necessary if 'irrelevant' or erroneous material is to be removed from data bases. On-line operation has also brought to the attention of the user the redundancy caused by overlapping coverage of different data bases. 'Why can't they combine their resources?' is the rather simplistic question often asked. Overlap of data bases is not the only concern. Given that there is too much printed secondary material available, there is still only one hard-copy *Chemical Abstracts*, but now there are three, four, five . . . versions of CA on-line with different software, command languages, etc. Such duplication and variation is a hindrance to the user. Co-operation and standardization is the answer to this, not user education.

Ease of use is one barrier to acceptance and ultimate use by the person seeking the information. ('Jobs for the boys' was how it was described to me—make it difficult, then you need an intermediary.) Cost, however, does not at present appear to be a

problem, though on-line use has brought an increasing realization that obtaining information costs money. My own library operates an on-line service on the basis of cost recovery. Nevertheless we have had many favourable comments about value for money—this despite us being small users (in volume terms) and therefore likely to be less efficient. It is realized, though, that the cost is unrealistic, being subsidized by sales of hard-copy. This does worry some users because there is little chance that hard-copy subscriptions would willingly be dispensed with and there is fear that the costs of hard-copy will go up even more to continue to subsidize on-line development. Were a full economic rate charged for on-line searches I have no indication of how this would affect the use.

Perhaps the necessity to recover costs is worth commenting upon. This is forced upon us. Putting it simply, if no cancellations are to be made, then, when money is tight, costs of providing extra services have to be recovered. I therefore disagree with Collier's comments when he said:

I believe that, for the information users, if they wish to remain masters of the new information medium, they have either to work on a dramatic re-modelling of their budgets to embrace books, journals, indexes, terminals, PTT royalties and host computer payments or they have to keep their budgets for purchase of primary materials and let the new systems become established elsewhere within the company, university or organization.¹

Cash limits are real and the balance of how money is spent must and does reflect the users' requirements. In time I believe there will be a re-balancing as user attitudes change.

One or two other matters relating to on-line were raised in my conversations with users. The first is publicity, or rather lack of it. Scientists complained of not knowing in more than general terms what is available. This applies to the library as well—nearly all the approaches prior to our going on-line were a result of library initiative. This may be a realistic approach if you are selling the equivalent of a Rolls-Royce and can rely on your reputation but not if you are selling the equivalent of many other British cars. I sometimes wonder whether this apparent lack of concern is because we, as small users, are left to get on with it while systems operators and data base suppliers look after major customers. The whole information industry needs to be more positive in demonstrating the value of on-line to the end users so that its potential can be brought home to those users. The question then arises—who pays? Why should I do somebody else's work for them and have to pay them into the bargain? I don't expect to pay for the petrol when I test drive a car. The alternative is to rely on word-of-mouth recommendation from satisfied customers and that is a slow process.

Linked with publicity is training, which at present is very much geared to intermediaries, but, to my mind, totally ignores the first stage—the necessity of interesting the end user who is almost ignorant of potential developments. However it must be said that the necessity for the librarian to act as an intermediary has been beneficial to the library because librarian and user have of necessity been talking in depth about research needs in a way that was perhaps not possible before. Whilst it is necessary for the librarian to continue to act as an intermediary for the immediate future because of the low use, this will not always be so. Eventually, I believe it will be necessary to pass the responsibility over to users themselves as numbers increase,

bearing in mind that our role is to provide a total library service not just an information service.

Acceptance among and increase in the number of users will be slow while access is primarily to bibliographic data bases which retrieve references and not facts and numbers. As more numerical/factual data bases become available so users will become more willing to make use of them

What then does the future hold? Ultimately it will be what changes the users are prepared to accept that will determine where we go from here. What is possible and what is acceptable may well be very different things. At present the tendency seems to be not 'what developments do we want?' but 'what are we going to be offered?' Along that road lies failure. Just think of the microfilm revolution that was heralded a few years ago. Greater sophistication is not always required despite the fact that we so often are assured that it is. Changes to simplify access would be acceptable; more numeric data bases would be welcomed.

It is difficult to say much more. We are still in a period of growth and development, but I would like to close with a thought of Sir James Cook speaking to the British Association for the Advancement of Science in 1966 and quoted by Gray and Perry:

I think that one of the real needs we face today is to persuade scientists to participate actively in the development and improvement of information services as they used to do. Otherwise there is a danger that an unbridgeable gulf will appear between information specialists who devise or improve services and the scientists who are supposed to use them.²

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Information for industry—the role of the information broker

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Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18–21 September 1979

MY PURPOSE IS to draw the attention of the information profession to the fact that the majority of British companies have totally inadequate access to information, to outline the role information brokers can play in alleviating the situation, and to stimulate discussion. In view of the overall theme of the conference, the economics of information, it is probably time that due attention was paid to the problems of what is almost an information 'third world', because of the possible adverse effect on the economy of the United Kingdom if it continues to go unnoticed. The size of the problem is substantial; on the British industrial scene, the professional information population is dwarfed by the actual number of companies.

I would like to look at one particular area of information access and information provision, namely that concerned with business development. One of the most important aims of any company is to have a succession of new products, be they consumer or industrial, with which to generate revenue and profit. The overall business, or new product development, cycle is shown by the S-curve shown in Figure I. In the early stages there is a considerable investment in time and money which in turn will generate profits over a considerable (ideally) period of time. It is during this early 'investment' stage that information becomes a vital factor in successful new product development.¹ This information typically relates to new technology, new products, new markets, patents and the activities of competitors. The importance of information in business development was well summed up by American President Lyndon Johnson who commented that, 'The fire of progress is lit by inspiration, fuelled by information and sustained by hope and hard work.' Without adequate access to information it may be that the new product will give rise to inadequate profits, or that profits will be generated over too short a time period, for the overall benefit of the company. Thus it is most important that industrial companies have access to a wide range of information at a reasonable cost. It is fairly easy to demonstrate to companies the value of information in a new product development context, since the shape of the profit curve can be related to the initial investment.

Information access—the present position

There are a number of places that a businessman could, in theory, turn to in order to obtain information. However they all have a number of limitations. Government

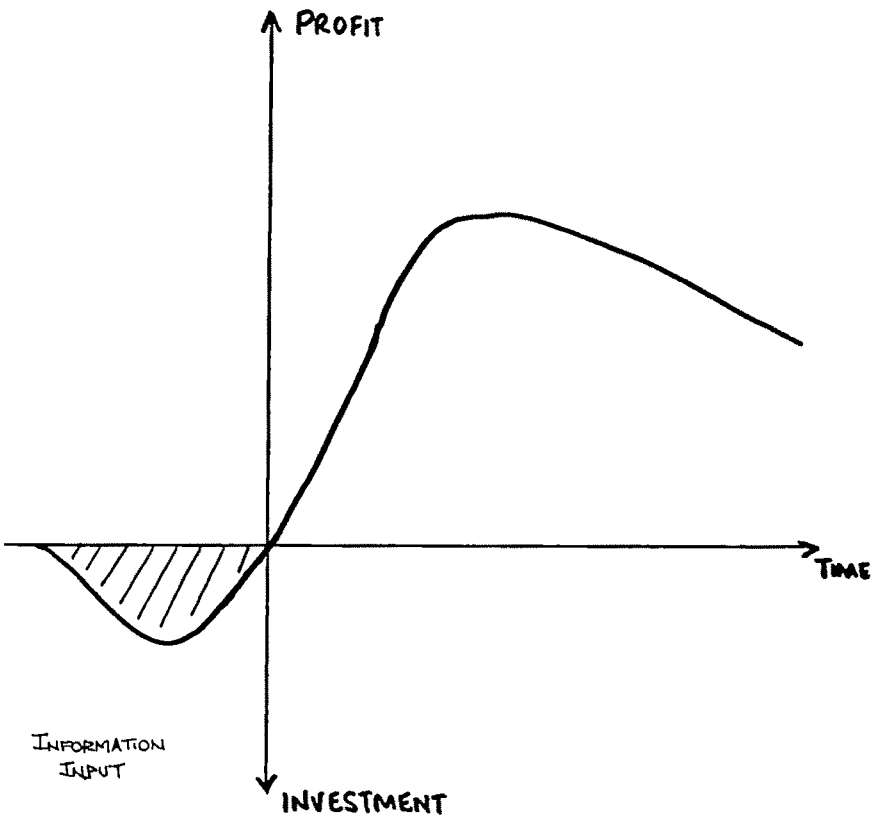


FIG 1 Product life-cycle 'S-curve'

resources, for instance, are very difficult to locate because there is no unified directory of government departments and employees such as that produced by Washington Researchers Inc.² The British Library has vast information resources, but again it is often difficult to know where to begin in such a complex organization. Research associations, such as Aslib, which have a definite membership list, create considerable problems for industry. Certainly member companies are well provided for and increasingly non-members can obtain information from research associations on payment of a fee but often it is rather a restricted service that is available. There are of course a large number of trade associations, and also of professional institution libraries, all of whom can provide a considerable quantity of valuable information if only the director or senior manager in industry knows what information can be obtained, what the conditions of access are, what the cost is, etc. One of the traditional methods of obtaining access to information has been the public library, many of which provide excellent commercial information services. However, increasingly with the cut-back in public sector spending, public libraries can no longer offer the service that they could in the past. One wonders what the effect on the UK economy would

be of any serious cut-back in the services available from the City Business Library, which few people realize is part of the public library service of the City of London University libraries at one stage constituted an important information resource which had an interface with industry through the Industrial Liaison Officer scheme. Regrettably this scheme was cut right back and now university libraries are often under-used (where they can be used) by local industry. This brings me to the question of whether information brokers will become an important channel of information access to industry in Great Britain.

Information brokers

I would like to present you with two definitions of information brokers.

An individual or organization who, on demand, seeks to answer questions using all sources available, and who is in business for a profit.³

A friendly expert who collects and packages information for a fee in response to the needs and demands of information clientele.⁴

I particularly like the second definition, because of the 'friendly expert'. It is vital that a rapport is built up between broker and client.

Already in the United States information broking is an industry with a turnover probably in excess of \$10 million a year. The key centres for information broking are undoubtedly New York and the conurbations of California. What is particularly interesting about the Californian situation is that Proposition 13, which resulted in a dramatic cut-back in taxes, has resulted in a considerable cut-back in library resources as well. This coupled with the entrepreneurial spirit of the Californians has resulted in a large number of brokerages being set up. These brokerages provide a range of services, but almost always include on-line search facilities. These are often not promoted as such but merely offer a general on-demand enquiry service. Other services include document delivery (for which extensive use is made of university and public libraries to supply the documents), record management, translations and information consultancy. The overall aim is to provide access to information by a single telephone call. Although the growth rate in the USA is currently approaching 150 per cent per year, the role of the information broker in the UK is still open to some discussion.⁵

Without doubt industry is really familiar with only one information retrieval tool—the telephone. Even then, the executive simply does not have time to make a large number of telephone calls, each time explaining precisely what he thinks he wants, but to a different person. I feel it is most important that the businessman has to place only one telephone call in order to set up a chain reaction of information access procedures which results in the information being presented on his desk when he needs it, in the format that he needs it, and at a cost that bears a relationship to its value to that person concerned. This requires a good working relationship between information broker and businessman.

However, the information broker faces many of the problems that the businessman does in obtaining information. First of all there is the problem of paying for the information. It is often difficult to actually write out a cheque for services rendered in cases such as university libraries or trade associations. In many cases there may be

very good reasons why the organization concerned does not want to make a charge for its services, but there are other occasions, purely because no mechanism has been established for the transfer of money, when a promising line of enquiry may come to an abrupt halt. It is important to realize that information brokers do not wish to obtain information for free.

Brokerages are regarded with considerable suspicion at the present moment, largely because of ignorance as to their function and their organization. There is important work to be done here. In recent months there has been a campaign in the UK run by the Law Society to provide a general education to the public, so that a solicitor's practice can build on that in obtaining business. I would suggest that there is a vital role here for Aslib in educating industry into the importance of information access, and of the services available, including brokers. The important thing to realize is not that information does not exist, just that information is very difficult to locate and retrieve.

As the Meteorological Office recently commented,⁴ 'It is evident from the enquiries that come to our offices that very substantial numbers of these smaller firms have little idea of what we can provide to assist with their operations.' It is very easy in conferences such as this to be complacent about the standards of provision of information in the United Kingdom. Each of the companies represented at this conference no doubt has an excellent information department with skilled professionals. We often ask ourselves the question, 'Where would our companies be without us?' It is time that we asked that question on behalf of the thousands of other companies which do not have the same access to information expertise, and therefore to information. Look at your library shelves and note the number of directories you have to enable you to track down external sources of information. How many companies without a formal library even know of the existence of these invaluable directories, or where they can be obtained? We must remember Dr Johnson's words, 'Knowledge is of two kinds; either we know a subject ourselves or we know where to find information upon it.' I submit that too few companies in this country know where to find information, to the detriment of the British economy. It is time that an examination of this problem is carried out, and appropriate remedial measures taken. In five years time it may be too late.

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User valuations and resource management for information services

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Being able to show a benefit for information services to balance against their cost, and knowing what criteria to use for choice among the options for their provision—these are needs which loom large for information people. This paper reviews what techniques have been found useful, and tries to show how valuations from the clients of information services can be brought into the equation.

THREE SORTS OF people are involved in managing the resources of a library/information service—the funder, the clients, and the manager of the service.

The funder hopes to see some return for an investment in the service, and really ought to set out a policy for the service as well.

The client has some idea of the types of services he can use, and some expectations about their quality. The client may need documents themselves, or a list or a summary of documents, or the answers to questions, and may need to be kept informed on new developments affecting his/her work. The client will expect the service to save at least the time otherwise spent on looking for things personally, will expect the service to be easy to use, and will expect it to be reasonably successful.

The manager of the service needs at various times some or all of the following:

- some indication on what to do for the clients,
- pointers on how to allocate what funds are available among the different needs involved;
- to be able to justify the resources consumed at present, or those required in the future, to the funder; (This need arises when the manager is obliged to formulate a policy for the service, in the absence of one from the funder.)
- help in choosing among various modes of provision of some services;
- to ensure that labour and materials are being consumed efficiently;
- to maintain the quality of services

This paper reviews techniques appropriate to two of the manager's needs: justification of resources and choice among options

User valuations and resource management

Oldman¹ describes two different orientations in the literature of library and information systems, one focussing on the user, the other on the system. The user orientation says, in effect, 'Let us listen to our clients and plan the service around their needs.' The system orientation is about resource allocation. It says, 'We have these resources, which must be managed in a responsible manner.' Oldman argues for an amalgam of these two orientations. She reminds us that many systems studies are made with scant regard for the user, incorporating dubious assumptions about user behaviour.

There is a long history of asking library users about their needs and how they feel about a service which has already been set up for them. The responses are generally unhelpful. Their information needs are usually expressed in terms of a document or a type of document. Also one is left with the impression that there is a great deal of unspoken information need, either because clients do not recognize needs, or because they do not see a library as the place to satisfy them. Responses from users about how the services provided suit them are just as unhelpful. People are grateful for information services, and their gratitude seems to get in the way of making a useful assessment. People are conservative to the extent that the service they are receiving at the moment is quite often preferred to one that might force a change in their habits. What I am saying is that it is difficult to combine a user orientation with the system orientation, because we cannot rely on the answers we get from the users.

Nevertheless it is vital to have some input from the clients to illuminate decisions about design and allocation. A serious problem in any sort of service organization is through lack of user input to end up doing the wrong things very efficiently.² Arnold points out that heavy reliance on cost-benefit analysis in library planning could mean that one or two services that looked well on net benefit would be provided, to the neglect of other essential but apparently unprofitable contributions to the work of the clients.³ In this review I have taken up Oldman's challenge, and tried to show how the user orientation can be combined with techniques for resource management. I think we may have been asking the user the wrong questions.

Justification of resources consumed

'Why is there a credibility gap between management, which thinks that information services cost far too much, and represent a luxury, and librarians and information managers who believe that such services are indispensable?' asks Wilson.⁴ The librarian or information officer is like a general practitioner—using knowledge and special skills to give a service which is appreciated when it succeeds, but at the same time given only grudging financial support. This could merely betray society's lack of faith in the continued support of its physicians, and management's of its information providers. Fortunately it is not as simple as this. Why *does* management regard information services as a luxury? There are several contributing factors.

A lot depends on the sort of management we are talking about. The manager who holds the purse strings may have a scientific approach to problem-solving, or may like to play things largely by ear. The first type of manager can see some advantage in the systematic collection of information about the task in hand, and its dissemination to staff. A person of the second type is more likely to see a library as educational in function, and be less able to see the need for an organized information service.

In many organizations, library and information services are part of the general overhead, their cost being spread over all departments in the organization. At times of financial stress there will inevitably be pressure on top management from department heads to reduce the burden of overhead charges, so that they may see a larger part of the organization's revenue available for running their departments. At these times the canteen, the gardens and the library can suffer. The need to reduce the size of overheads shown on a cost analysis submitted in support of a merger or takeover bid can have a fatal effect on libraries and other service departments.

A concept that has done more harm than any other to library funding, in industry at least, is that of the profit centre. It became fashionable a few years ago to regard each department of a company as having a financial input and output, and to encourage at least a balance if not a net profit from departmental operations. Applied to marketing, sales or production departments the profit centre concept can give a departmental manager a convenient yardstick for measuring efficiency. However, as in the case of 'management by objectives' a few years earlier, the profit centre idea is not applicable to all departments with equal success. Yet in the profit centre era a department without a cash output, or one capable of easy conversion to cash, becomes a 'non-profit centre'. Guess what happens to non-profit centres when we need to show a convincing cost analysis. This is another reason why 'information is considered less indispensable at times of economic recession' as Oldman puts it.

Librarians' recipes for dealing with what Armstrong⁵ describes as 'a keen smell of corporate surgery in the air' are mostly reactions to the impositions laid on them by accountants which have been described above. If library services are charged to the departments which receive them, the library is no longer part of the general overhead. If a value in terms of cash can be ascribed to the effects of library activities on its clients or on the organization, then the library has a cash output to balance against the money consumed in its running, and can assume the more respectable status of a profit centre.

These and other approaches to justification will be discussed under five headings.

The use of performance measures;

Attempts to show a benefit in terms of cash;

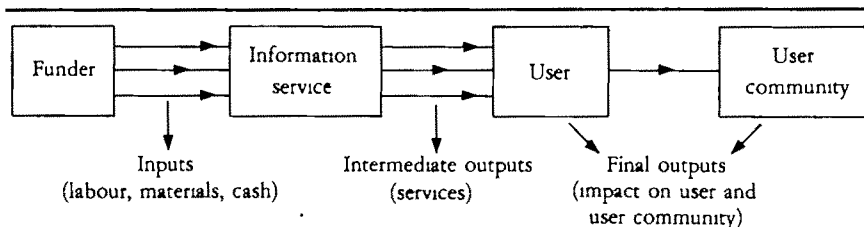
Measuring the total client time 'spent' on the services;

Charging for services,

Demonstrating that the funds provided have been used to supply specific information inputs to the work of the clients

Performance measures as a means of justification

We can think of an information service as having inputs of labour, materials and uncommitted cash,⁶ and outputs of two types, as in Figure 1. The intermediate outputs are the services which arise from the library/information system (loans, photocopies, SDI notifications, etc.). The final outputs relate to the impact of these services on the clients or on the organization to which the clients belong (advantage gained, time saved, etc.). Performance measures are intermediate output measures, and a list of some of these is given in Table 1.

FIG 1 *Information service inputs and outputs*TABLE 1. *Intermediate output measures for library and information service*

Performance measure	Reference
Number of library users	Rzasa & Baker ⁷
Acts of use of the library	—
Photocopies requested/supplied	—
Enquiries made/answered	—
Loans to clients	—
Amount of study space used	Rzasa & Baker ⁷
Satisfied demands	Buckland <i>et al</i> ⁸
Time taken to get requested document to user	Orr <i>et al</i> ⁹
Number of document exposures	Hamburg <i>et al</i> ¹⁰
Item-use days	Meier ¹¹
Time user is exposed to documents	Hamburg <i>et al</i> ¹⁰

Use of intermediate output measures for justification has been heavily criticized on two counts. Firstly the number of things produced by a service is proof only that the service has an output. It could be doing the wrong thing very efficiently. Secondly acts of use are suspect as measures of value because it cannot be assumed that a client will obtain something of value just because he has borrowed a book or sat at a table or asked for a photocopy. However Klintoe¹² found that the presentation of an analysis of costs and intermediate outputs to his funder was a useful justification technique. He used this method successfully at the Danish Technical Information Service. His regular statement to his funders has two columns (Figure 2). In the first column is a breakdown of costs into salaries and materials for each of several services provided. The second column shows opposite each service a list of accomplishments for that service during the same period. Klintoe describes the main advantages of his presentation as follows: 'discussions with the Board of Directors can be conducted on the level of policy issues, not on detailed expenditure' and 'the public auditor . can see exactly how the money is spent and the use to which it is put'.

Costs		Accomplishments
b) Requests for procurement of information (DK/S tasks)		
Salaries, engineers (2594 h)	Dkr. 118,333	213 tasks from 116 diff. inquirers, i.e.
Salaries, office staff (914½ h)	- 15,994	3 organisations
Consultants	- 5,117	8 centres of spec. knl.
Information materials	- 5,127	104 mfg. companies
Transportation and car-fare	- 4,875	1 public service
Hotel and board allowances	- 1,295	
	Dkr. 150,741	213 tasks have been:
		199—procurement of information
		14—planning and management of courses and conferences
Cost per request: Dkr. 708		Turnover per order: Dkr. 606
c) Requests by telephone		
Salaries, engineers (660 h)	Dkr. 31,602	Approx. 2000 requests.
Salaries, office staff (86¾ h)	- 1,524	
	Dkr. 33,126	
Cost per request: approx. Dkr. 17		Free of charge.
d) Requests from foreign centres or from own organization (DK/U and DK/AD tasks)		
Salaries, engineers (339½ h)	Dkr. 15,826	74 tasks, i.e.
Salaries, office staff (101¼ h)	- 1,834	58 foreign
Information materials	- 1,386	16 internal
Transportation and car-fare	- 353	
Hotel and board allowances	- 100	
	Dkr. 19,499	
Cost per task: approx. Dkr. 264		Free of charge.

FIG 2. Extract from a statement of costs and intermediate outputs presented to the funding agent for justification purposes, after Klinton.¹²

Showing a cash benefit as a means of justification

The several approaches to justification by showing a monetary advantage as a result of information services are summarized in Table 2.

- (a) That information has been supplied which can be shown to have given an advantage to a client or to the organization is a powerful source of justification for an information service. One tends to think here of massive sums saved in investment funds or research time. Martyn²² and Strable²³ give examples of this. Moisse¹⁴ describes losses due to lack of information. Hanson and Slater's excellent

TABLE 2. *Justification techniques which show a monetary advantage from services*

Monetary advantage	Reference
(a) Tracing a money-saving event back to information supplied by the service	Hanson & Slater ¹³ , Moisse ¹⁴ , Arnone & Jackson ¹⁵ , Hess ¹⁶ , Martyn ²² , Strabel ²³
(b) Showing the cost of supplying information as a small fraction of the possible advantage gained from using it	Wills & Christopher ¹⁷
(c) Showing time saved for the client.	Nightingale ¹⁸ , Fearn & Kovalik ¹⁹ , Wolfe ²⁰ , Mason ²¹
(d) Asking what it is worth to continue to supply the service	Univ of Durham ⁶ , Wolfe ²⁰

summary¹⁸ gives examples of both. Obviously one or two corporate triumphs traced to information supplied by the service will help. However, in creative work of any kind, there is a quiet series of useful inputs of lesser magnitude going on all the time. The problem is to identify what part information from the service played in the success of a venture.¹⁸ Hess suggests that when people bring items back to the library, they should be asked what use has been made of each item and for what purpose.¹⁶ I suggest that something more than discreet enquiries at the library desk is needed, and that the need for justification is another good reason for working close to the clients. Some of the benefits of a good information service may be more subtle than the advantage gained from a speedy end to a project. Hall⁴⁴ tried to show how possession of an information service can make its clients more used to looking for information and putting it to use in their work. It seems difficult to get clients to admit that the information service, however good, has had an effect on their habits, in my experience.

- (b) Another justification is to relate the cost of getting information to ensure success for a project to the profits expected, or loss to be avoided. The cost can usually be shown to be a very small fraction of the expected loss or profit. Wills and Christopher¹⁷ give an example in which the project is the launch in another country of a product currently sold in the UK. How much should the company be prepared to spend on information to help with the decision? The payoff at various percent shares of the new market is calculated. Prior to collecting any information, there will be an estimate of the probability of achieving various shares of the new market. The lowest likely profit (or highest loss) to the company represents the maximum sum it would be worth paying to avoid an unfavourable outcome.
- (c) Perhaps the most commonly reported approach to justification is to balance the cost of a service against the time saved the client by not having to do things personally which the service does.

A very direct approach is that of Nightingale.¹⁸ To justify the expenditure on a current awareness bulletin, he found how many journals the clients would have to

TABLE 3 *Scanning time saved by one SDI service¹⁹*

Number of clients	Hours per week saved
1	$\frac{1}{4}$
3	$\frac{1}{2}$
12	1
29	2
7	3
8	4
5	5
1	6
1	7
1	

scan themselves if no bulletin were available. The total annual cost of all this scanning he found to be £29,600. The bulletin costs £2,500 per year, so there is a saving of £27,000.

Fearn and Kovalik¹⁹ asked the clients of their computer SDI service to state how many hours of their time per week were saved by elimination of the need to scan abstracts, current contents pages, etc. (Table 3).

They were able to calculate that a total of 8,000 man hours per year was saved by the sixty-eight recipients of their service. The average hourly salary of a client multiplied by 8,000 minus the cost of the SDI service gave a figure for net benefit from the service. They found a benefit of three dollars from every dollar spent.

Mason²¹ calculates the difference between the cost of an enquiry service given by the information unit, and the cost of the clients' doing it for themselves. The advantages of centralized documentation and the expertise of the information workers shows through in the results of such a calculation and makes it useful for justification purposes. He also justifies the activities which contribute to an information service by showing how much more they would cost if done in another department of the organization.

An oft-repeated criticism of time saved the user as a measure of benefit of information service is that 'a saving of time is not necessarily an increase in productivity unless the time saved is used for something productive' (Bowerman²⁴). Wolfe²⁰ points out that one cannot assume that one hour saved on information seeking is necessarily equivalent to one hour spent on one's work. In an investigation of the value of abstracting and indexing services to clients, he asked researchers how many extra hours they would need to work to maintain their research output if they had no secondary services to supply information.

(d) The value of an information service to its clients could be indicated by the amount they were prepared to pay to keep it going. This is the thinking behind the attempt by Morley and Hopkins⁸ to justify a current awareness bulletin. They found that staff in receipt of a bulletin would give an average of £6 per head of their own money to keep it going. (On the other hand they would vote £32 of university money for this purpose!) If questions about payment to sustain information services

are asked in an attempt to justify them, it is as well to pretend that the questions are not hypothetical. The Durham University survey included the sentence, 'Please note that you may well be asked to pay the amount to which you commit yourself.' In the event, twenty-two of the recipients of the bulletin were prepared to vote sufficient funds to pay for the labour cost of producing a bulletin for thirty people.

Clients' time 'spent' on the service as a means of justification

In a market situation, goods are manufactured at a certain cost to the provider and sold at a certain price to the customer. Their value is thus apparent to both parties. In the case of library and information services, their cost is clearly apparent, but as their customers do not have to put their hands into their pockets on each occasion of use there is no awareness of value. The user of library and information services does pay for them however, *with the amount of time personally spent on the service*

This briefly is the argument for justification of free services by measurement of the time their clients are prepared to spend in using them. It can be developed as follows: in a bad library clients may spend a great deal of time in getting what they want, but they will not do this very often. They will eventually go elsewhere for the documents or information which are so hard to obtain through the library. In a good library, clients may well spend less time per visit, because their requirements are easily met. However they will come again and again, because it costs less of their time to use the library service than other competing sources of the same information. One could define a good library and information service as one that can supply useful information at the lowest possible cost to the client in terms of client time that must be put into the transaction.

Orr²⁴ discusses the pros and cons of collecting information on the time spent by library clients on using library services by the diary method and by random time sampling using an alarm carried on the person. He comes down on the side of the second method, and gives examples of its use.

Kochen's measure of the effectiveness of an information service is the number of clients who, having used the service once, come back to it a second time.²⁵

Justification of services by charging for them

The transfer of cash from the clients of an information service to the suppliers provides the information department with a monetary output to balance against the funds it consumes. It has another advantage in that one of the problems with a free information service is that, if it is a good one, everyone wants its products. Charging for services helps to reduce the 'me too' usage by people who want the service but do not necessarily need it.

There are three approaches to charging for information services.

- (a) to make a token charge in order to show that the services are valued;
- (b) to charge so as to cover the cost of the services;
- (c) to sell the services in an attempt to make a profit.

(a) Any charge which the clients will bear can be used to demonstrate the value of a service, but Zais²⁷ reports that the appropriate price is the cost of producing the single items provided. This price is open to detailed interpretation, but the idea is to ignore the fixed costs of the whole operation. For instance the price of a manual search might be the cost of the searcher's time, ignoring the cost of the stock or data base he searched. A bulletin might be supplied at the cost of paper, printing and distribution for a single copy, ignoring the scanning cost and the cost of material scanned. Provided that a simple formula for calculating charges could be worked out, this system of pricing could be used to give the funder an idea of the value of the services to the clients. However one thinks of Arnold's comment that unless large amounts are to be transferred it 'may be absurd' to set up an accounting system to deal with them.³

(b) Charging to recover all costs of the library/information service on the face of it seems a sensible procedure, but it is probably the most difficult of the three approaches to get started. A costing exercise on the library and information system has to be done, and some way found to allocate the costs of materials, machinery, the manager, the doorman and the teaboy to the services consumed by the clients.

The usual approach to costing services is firstly to identify the *activities* that go on in the unit day by day, and decide in what proportion they contribute to the *services* consumed by the clients. Then the activities are costed in terms of labour and materials and machine costs. Finally the costs of activities are distributed among the services (Mason,²⁸ Raffel & Shishko,²⁹ Price³⁴). The cost of items which cannot be traced through to particular services are allocated to all services at the same rate (Marron³²) or in proportion to the labour cost of services (Price³³). Armstrong⁸ has something useful to say about overhead costs and their allocation during costing. Vickery³⁰ reviews methods of measuring how labour costs are distributed across library services. A common technique is for library and information staff to keep a diary of how they spend their time on their main tasks, or alternatively a record of time spent on tasks other than the main task (Smith & Schofield³¹).

Some system of charging has to be agreed with the clients of the service, and arrangements made for a charge to be made across departments.

When users of the library and information services have to pay for them on the basis of the amount of use they make, instead of a standard overhead charge which is levied whether they use the services or not, they begin to weigh up the value of their transactions with the library and their use of it may decline. Hence one of the problems of operating a cost recovery system for information services is that more flexibility than usual has to be available in the staffing of the service. A fair proportion of part-time staff on limited contracts can give this flexibility, together with the use of outside consultants. Another problem is that the charges made on departments, because they have to be loaded with overheads of the library and costs of materials acquired but not necessarily used for a particular service, may have an inhibiting effect. One answer is to make a charge which covers the labour cost of services, and to agree with departments an annual sum based on their use which will go towards the cost of materials and library overheads (Cook³⁵).

(c) Perhaps the happiest way to justify the funds invested in an information service is to make a profit, by selling services to customers other than one's own captive audience. Examples of situations where this is possible are the information services

of research associations and professional bodies, when there is no restriction on their commercial activities. Both sorts of organization have a ready-made clientele, which can be extended. An area of the country which has a high degree of technical or commercial activity, but no good information service besides one's own provides a similar opportunity. One has to consider how unique is the service that can be offered, and what potential use there is for it. Norton³⁶ gives a checklist of questions for those information units thinking of 'going commercial'.

The pricing of information services sold on the open market does not have to conform to one's management accountant's way of seeing things, so one has a freer hand. A common starting point is to see what it costs people to obtain the product one has for sale by other means, either by their own efforts or from a commercial source. The less work the customer has to put into making use of what one provides, the higher can be the charge. People will pay more for evaluated information than for a list of references (Koch³⁷). A loose-leaf updated handbook or compilation is much easier for them to use than a hardbound book with innumerable supplements, and will attract a higher price. For a service which is unique, one can charge what people are prepared to pay.

The above sketch of commercial practice in this area should be supplemented by Lutz³⁸, White³⁹ and Zais³⁷ on the theory of pricing, and the interesting discussions of charging written at the time when information centres in the USA were being encouraged to pay their way (Veazie⁴⁰, Schwuchow⁴¹, Wilson⁴²).

In whatever manner charges are made for information services, there will be resistance from clients who previously received documents or information for nothing. Veazie⁴³ says that charges affect use in the majority of cases. In his experience 8-15 per cent of clients will drop the services altogether, and 16-28 per cent will reduce the use they make of them. Terry⁴⁵ describes the introduction of voluntary charges at the regional Primate Information Centre in Washington, where imposition of fixed charges would have been unfair to researchers and students. A fee for each service was suggested, and the client given the opportunity of paying all or some or none of it. Terry found that long-time clients did eventually adjust to the need to buy information, previously obtained free of charge. She makes the point that voluntary payments for services could be used as a guide to the value placed on them by clients.

Justification by demonstration that the funds provided have been used to provide specific information inputs

One problem of justification is that information is not seen as a resource, by either the funder or the client. (Universities are built from concrete and bricks and mortar and trees and water, but without information these things might never emerge as a useful campus.) To be able to show a list of *information inputs* essential to the work of one's clients could be a powerful argument in obtaining the funds to supply these inputs.

The approach is illustrated in Figure 3 by a *task analysis* of basic research. Each task requires some information for its successful completion, and some of these information inputs are shown.

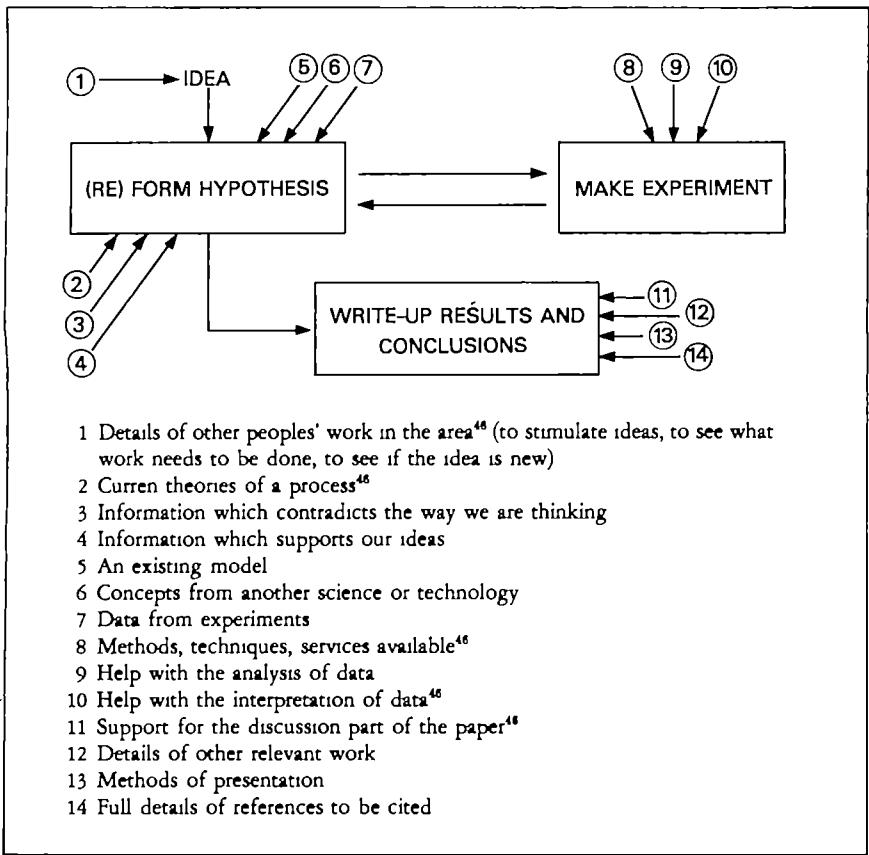


FIG. 3. Task analysis of basic research, with information inputs to the tasks

Figure 4 illustrates a task analysis of product development, and Table 4 shows some of the information inputs which contribute to each task. Despite the generality of approach it will be seen that the information inputs give a clear idea of the sort of information which could be collected and disseminated by an information unit serving product development work. Commercial as well as technical information is involved.

The literature contains several papers which describe different types of work in terms of tasks, and describe the sort of information which is put to use in those tasks (the papers by Chaddock⁴⁷ and Wolek⁴⁸ on the information requirements of engineering design for instance). Radley⁴⁹ gives a task analysis of company operations as a whole and lists the information inputs, but not in enough detail to provide a convincing demonstration for justification purposes. Some indication of information inputs for investment decisions, forward planning and marketing are given by Aguilar,⁵⁰ Schoner,⁵¹ and Jones⁵² respectively.

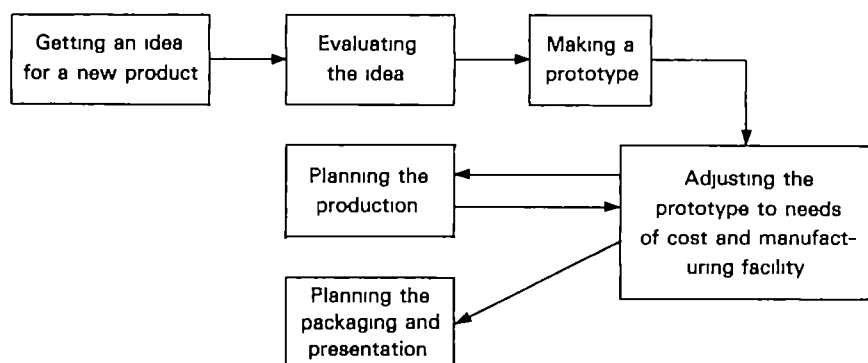


FIG. 4. *Task analysis of new product development*

The value of this technique for justification lies in the fact that to construct the analysis the information manager needs the help and agreement of the funder and the clients, so that the true nature of the contribution to their work becomes obvious to them. Information managers can take the lead in the construction of a task analysis, where their overall view of the work of their clients is helpful. As regards the information inputs, many of those shown in the figures were got by discussions with clients using the critical incident technique, and others were discovered at a time when a programme of evaluation of research projects was under way.

Choice among options

The literature of choice tends to be dominated by comparison of information given with the aid of computerized abstracting and indexing services versus services relying on the resources of a library. I think this is unfortunate, because such studies tend to obscure the real problems of choice, which were here before computers came into the picture. The studies are often occupied with attempts to justify the installation of a terminal for on-line work, in which case they attempt to show how cheaply on-line searches may be run in comparison with the cost of labour, materials and travel associated with manual searches of the same sort. They may be studies which use the measures of recall and precision to compare on-line and manual searching, in imitation of earlier work in which these measures were used to compare the effectiveness of alternative indexing techniques in a controlled experiment. My contention is that neither type of study gets to the heart of the matter of choice among various techniques for giving an information service.

The problems are twofold.

First there is a variety of choice due to information services' being produced by sources which are in competition with information officers. Furthermore these services can often be used directly by technical and commercial people without the intervention of their librarian or information officer. (I mean services like reproduced contents pages of journals, printed or computerized abstracting and indexing services, subsets

TABLE 4. *Product development—task analysis and information inputs*

Tasks	Information inputs to tasks
Idea for a new product	Areas in which product development is needed Consumer need Competitor's product Patent applied for or granted Results of basic research New techniques for production Raw materials used already Production processes used already News of alternative materials for formulation Company markets
Evaluating the idea	Cost of developing the idea into a saleable product Cost of alternative routes to the product Consumer acceptance Relevant legislation Activities of competitors in the area Price at which product would sell Size of market for product
Making a prototype	Has anyone solved the problem in another way? Results of basic research Available materials and recipes Available methodology Design information
Adjusting the prototype to needs of cost and production facility	Alternative materials and recipes Alternative methodology Costs of raw materials Costs of production
Planning the production	Available equipment Design data for equipment Alternative processes and their cost Facilities available within the company Information on where production plant might be situated
Planning the packaging and presentation	Packaging materials Effect of air, water, time, etc. on the product Packaging methodology and equipment Consumer expectations of the product

of these and alerting services from them, bulletins produced and sold by other organizations, updated compilations of facts and figures on paper or machine.) *They are produced with a market, not individuals, in mind.*

Second, different types of client value different characteristics of an information service, and the value systems of the clients differ from those of the information service manager. Hall⁵³ reports that an information manager would tend to choose a service for clients on the basis of its reliability and its compatibility with the existing pattern of service from the information unit. Secondly the manager might look at the cost and timeliness of the service. Not until services have been ruled out on these considerations does the information manager consider things like ease of use and availability of the original—factors which the client sees as highly related to the value of the service to him.

Choice among options for information service clearly has to be done by techniques which allow combination of the manager's orientation towards cost and efficiency with the client's value system. Such a technique is cost-effectiveness analysis.⁵⁴ The key to the analysis is that a list of characteristics of a service is drawn up *which relate to its benefits*. Then a mode of giving the service under consideration is rated for each of these features, and an index of effectiveness is obtained for that mode by combining them. If this is done for all possible modes of giving the service under consideration, they can then be compared for effectiveness and cost.

Features of information services which have been used for purposes of comparison are listed below:

Coverage of scanning or of data base

- by subject area
- by type of publication

Timeliness

- relating to use of primary material
- relating to speed of processing of service

Precision

- the proportion of items notified which are relevant

Recall

- the proportion of relevant items in the literature which are notified

Novelty ratio

- the proportion of items notified which client has not seen before

Ease of use

- amount of information supplied by notification
- availability of original document

Blick⁵⁵ shows how a cost-effectiveness analysis can be used to advise on the choice among various approaches to giving a current awareness service (Table 5). The options, along the top of the table, are scored for various features which relate to the value of the service. Blick gives reasons for his scores. For instance a bulletin with titles only scores higher for 'timeliness' than one with abstracts, because of its much shorter production time. Blick has included cost as a feature, instead of calculating a cost-over-effectiveness ratio for each alternative, as described by Flowerdew and White-

TABLE 5 *Five alternative approaches to current awareness notification from Blick⁵⁵*

Feature	Titles-only Bulletin	Abstracts Bulletin	SDI Titles-only	SDI Abstracts	SDI On-line Titles-only
Timeliness	8	4	4	4	6
Relevance	7	7	4	4	6
Cost	6	3	8	7	6
Customer convenience	4	10	3	8	3
Suitability for large No. of customers	7	7	3	3	3
Total	32	31	22	26	24

head.⁵⁴ Also his analyses include features related to benefits to the information service as well as benefits to the clients. (See his 'suitability for large numbers of customers' in Table 5, and factors for 'skilled labour commitment' and 'controllability' in the other analyses in his paper.)

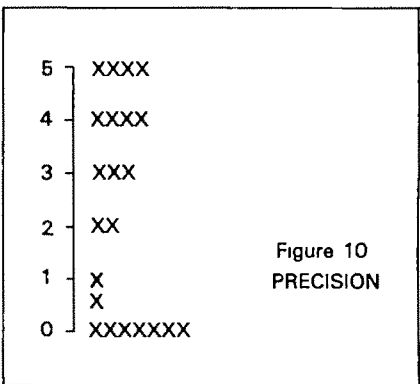
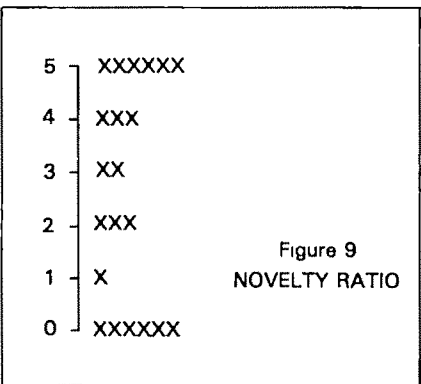
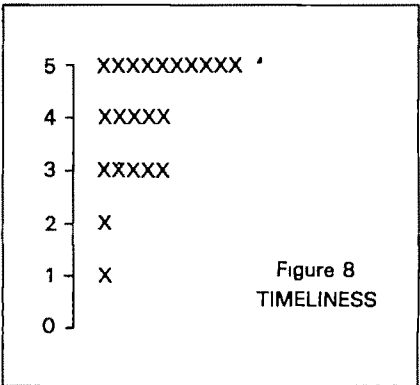
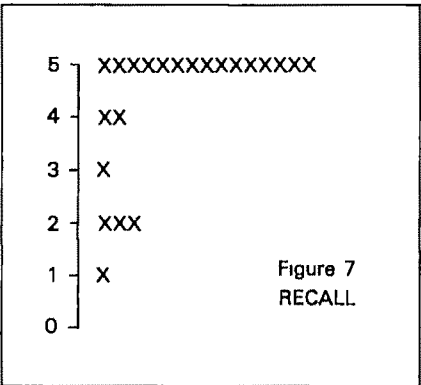
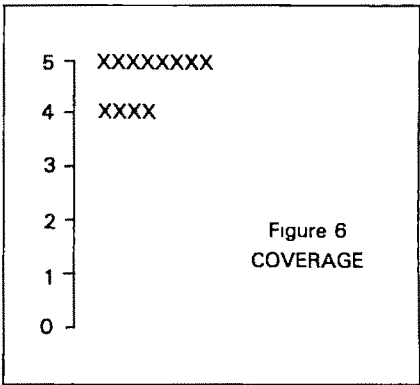
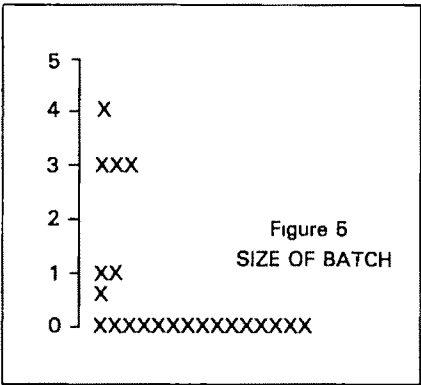
Both Blick and Flowerdew and Whitehead indicate that if the effectiveness analysis is to be a reliable aid to choice, the scores should be weighted in some way, since the different features of a service are unlikely to be of equal concern to any set of clients. (Clients might consider timeliness to be of paramount importance, much more so than precision, for instance.) Flowerdew and Whitehead say this can be done by the service manager alone, or from a survey of clients' attitudes and use.

Clients of manual SDI services were asked to say how six features of the service they were enjoying were related to its value to them.⁵⁶ They could score the degree of relevance to value for each feature on a six point scale. Figures 5-7 show that there was substantial agreement about the relevance to value of features like size of a batch of notifications (not related at all to value), and coverage of the service and recall (highly related to the value of the service). Timeliness (Figure 8) was seen as important, but many clients did not see it as so highly related to the value of SDI as recall and coverage. About the relevance of novelty and precision ratios to value (Figures 9 and 10) there was a range of attitudes all the way from not relevant to value to highly relevant to value.

It certainly does no harm to make one's clients think about things of this sort. If they could be educated to give responses which reflected their priorities with accuracy, a valuable input from the user to the manager's analysis would be obtained.

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FIGS 5-10. The degree of relevance of some features of an SDI service to its value to clients of the service—how the clients voted (0=not relevant to value, 5=highly relevant to value)

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Can we face the information explosion?

G. R. Cliffe

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Paper presented at the fifty-third Aslib Annual Conference, University of Sussex, 18-21 September 1979

'INFORMATION MANAGEMENT WILL be to the next half century what steam, coal and electricity were to the 19th century.' This quotation, which admittedly appeared as an inducement to buy a book, carries I am sure more than a modicum of truth. We have all heard, far too often, of the so called information explosion of the post war years, although there are many who deny that there is any such explosion and who say that it is merely a natural exponential growth which has taken place over possibly hundreds of years. Whether it is a 'big bang' or an expansion phenomenon does not alter the fact that we are faced today with a mass of information of a size which could not be envisaged a generation ago. Until the advent of on-line systems the size was possibly no problem to most people, in that the majority of the information was inaccessible or completely unknown, but we are now faced with a situation where the mass can be made accessible and known to all at the pressing of a switch or the lifting of a telephone. To continue the explosion analogy—up to now we have only seen the explosion, now we will feel the blast.

As information managers are we prepared as a profession or as a nation to face this blast? Surely it is our responsibility and certainly in the best interests of the profession that we make ourselves ready. We must immediately start thinking on a much larger scale than hitherto. We will no longer be an ancillary profession which will be expanded and reduced as a result of every economic ripple, we will be, *or should be*, an essential service at both national and domestic levels.

How can we prepare ourselves to face this kind of challenge and responsibility? What is lacking at this time which will be essential to make a success of our future commitments?

Firstly we must look to our own profession and our professional bodies in particular. We stand at the moment as a house divided by what I believe to be artificial boundaries. We must take steps to eliminate these boundaries, we must utilize the strengths of each section for the total overall benefit, and we must avoid energy-expensive overlaps of interests. The Library Association, the Institute of Information Scientists and Aslib will have to work far more closely together than they have in the past in order to achieve these objectives, we must present a much more united front whether we are presenting a case to the government, confronting information and equipment suppliers or organizing education and training. Only now is the Institute of Information Scientists considering extending its membership to cover non-scientific information workers—we should be thinking much more widely than this and bringing

under the information umbrella people like systems designers and communications professionals and including such disciplines in our training and educational programmes.

If we can achieve this more united profession, and the additional strength which this would bring, to which objectives do we devote this added energy? Education and training is an obvious target and it is certain that we cannot hope to utilize the mass of information available without the right kind of recruits to the profession and the right kind of education and training for all levels of information staffs. I specify *all* levels because I am sure that most of us have working for us or with us people who, for a variety of reasons, have missed the opportunity for full-time professional education. Although the proposed LA educational reforms will allow some of these people to reach a certain level of qualification in the future, there is still a need to ensure that such people, who are often the backbone of an information service, have an opportunity to utilize their talents to the full and have such talents measured and recognized. Schools of librarianship and information science should be brought more closely into the total information field; it is refreshing to see that the Institute has now opened its doors to lecturers in information science.

Now that the information explosion is really with us how are we going to utilize the wealth of data which it has released? When mineral oil was first discovered in America it was considered initially to be a mere nuisance which spoiled the land. Later it was used for lighting purposes but it took the introduction of the petrol engine and much later the petrochemical industry to ensure its full utilization. The information industry has just about reached the 'oil for lighting' stage and the present status of the profession tends to reflect this fact. I have already touched on the need for a review of professional education but this will be far easier to achieve than the very much greater task of educating our users. The larger industrial and the academic libraries have managed this to some extent but this is just the tip of the iceberg compared with the vast market which is available for our information product. Only when the public is shown what information is available will it recognize its need for it and once it recognizes that need this profession must be ready to supply it. We have all heard or read views on information in the year 2000 but what about information in 1985? I do not subscribe to the view that in the immediate future we will have a button-pressing public which will need no intermediary in order to obtain its information. For many years yet the main criteria by which the information user will judge the supplier will be:

- 1 it provides the information the client needs, not merely what is available;
- 2 it gives an immediate response to a request;
- 3 it is based on person-to-person contact;
- 4 it involves *for the client* the use of only familiar technology, e.g. the telephone.

What we should be aiming for in the immediate future is the provision of this kind of service on a national basis. To do this the co-operation of the professional bodies will be essential, training and education needs will need to be reviewed and the government will have to be persuaded to invest money.

We are all familiar with the word 'network' and most of us immediately think of computer link-ups in this context. What I envisage is a much wider network covering all types of information sources ranging from computerized data banks to the local

expert on cabbage root rot. Everyone, regardless of affiliation or location, should be put within reach of a branch of this network which will give access either to immediate information or to a system which will eventually use all available technology to find an answer. 'Why,' many will ask, 'should we involve ourselves in such a network when we already have enough problems supplying our own domestic needs?' My answer is that 'no man is an island' and until we see ourselves as part of a whole information scene we will remain in the same lowly status, as a profession, which we suffer from today. It must be remembered too that the greater the demand for information, the greater becomes the supply, and in this we all benefit eventually.

An integrated information network in this country will of course cost money, but probably much less than most people imagine. We already have the buildings in the form of public library centres and branches, we already have a nucleus of trained people, though many more would be needed, and we now have the technology. Much, of course, needs to be done before we could claim to have a national information network which will really utilize the available information to the full but I see it as a challenge which, particularly to the younger people in the profession, can be as stimulating as any we have ever faced in the past.

I repeat myself deliberately when I say that 'no man is an island'. We must stop thinking of ourselves only as special, public or academic information vendors or as information scientists, librarians or data processors. We are all information specialists and communicators and we each have the same ultimate objective. We must, if we are to raise ourselves as a profession, think co-operatively and think big. My final comment must be that with so many opportunities before us the future must be bright.

Discussion

SESSION 4

G. YSKA (Excerpta Medica, Netherlands): Does Martin White have any problems of confidentiality in the material he's been dealing with and should we have some kind of code of ethics?

WHITE: Do you mean the confidentiality of the information in respect of what I supply to one customer as opposed to another customer? One problem in costing a brokerage service is that if, for example, one buys a reference work in order to answer a particular question, should the subsequent use of that reference work be treated as a free gift to succeeding customers, since the first customer has paid for it, or should the cost be distributed over some unknown number of customers over a given time? I think some code of ethics will be necessary but there is not yet sufficient data to do this. It is sometimes difficult to convince our clients that the information we give them will not be transferred into another area.

M. S. DALTON (Unilever): One thing we don't want to import from business or industry is restrictive practices. Martin White was speaking about restrictions on the flow of information. I wonder how one might go about exposing the extent of restrictive practices in information work and try to eradicate it for the benefit of the profession?

WHITE: People are often unaware that what they are doing *is* a restrictive practice and, of course, we always tend to look at the short term benefit rather than the long term benefit. I doubt if it would be possible to produce a list of restrictive practices because many are restrictive only to a particular person at a particular time in a particular environment.

DALTON: There are probably some common denominators in restrictive practices which might enable one to form a basic list of genera.

WHITE: One area I feel strongly about is trade associations, some of whom fail to realize that their members depend on other areas of industry very often for information, but who are very tight when asked to provide information.

L. S. ADLER (Chemical Industries Association): If by restrictive practices you mean involving yourself in the business of your company (and I'm talking about partnership with your management) and protecting its commercial interests in a very commercial world then, yes, every information officer has a duty to do so. In the particular case of trade associations not all operate restrictive practices but there are clearly limitations in terms of time and money on what can be given away for nothing. Martin White says he is willing to pay for information but there are very good reasons why trade associations cannot sell information to a third party which I am willing to discuss with him later. But my own association is always prepared to help with a short telephone inquiry, if it doesn't take up too much staff time, or to let people search in our library.

G. TAYLOR (Offshore Information Literature): To give a specific instance relating to restrictive practices, a couple of years ago I was trying to get some information on accidents in the North Sea and, in spite of the lip service paid by the government at that time to freedom of information, it was very very difficult. I felt like an investigative

journalist because the more I asked the more the doors were closed in my face or telephones put down. And yet by writing to the Minister and plugging away for about six months I finally got fourteen pages of very good statistics. Another typical example is the position of the engineering institutes which have wonderful libraries which cannot be used unless one is a chartered engineer of one kind or another.

B R OSBORN (Edgar Vaughan) Referring to the large number of UK companies mentioned by Martin White which had no information access, was he ignoring the fact that many of these companies must employ engineers and other professional people who do have access to information through their own professional bodies?

WHITE No, I wasn't forgetting them but they only cater for rather narrow subject areas. What happens when the engineer is looking for information outside his discipline? I wonder how many of their inquiries have to be referred elsewhere?

E O G BATCHELOR-WILLIAMS (Unilever): Listening to Malcolm Stevenson I felt that he was talking about the kind of situation which we had in industry fifteen to twenty years ago. We had the same difficulty of interacting with scientists and we solved this by employing information scientists—people with scientific qualifications and acceptable to other scientists. I realize that the universities are in a difficult situation at the moment with money becoming scarce but although they are able to offer on-line services and library services they are not really answering inquiries or doing searches for the scientists, who probably find the on-line business a bit complex and react by asking for something simpler.

STEVENSON: Could I take another point first? Martin White did lay into the universities a little bit on the question of restrictive practices. I didn't raise it in my paper but one of our biggest complaints is that university scientists can get no information about industrial research and development and they consider this to be a restrictive practice. On the point raised by the last speaker, as I tried to say, the ethos of the provision of information within the universities is very different from that of the industrial situation. We delude ourselves if we think of ourselves as providing an information service: we are providing a library service and if one of the spins-offs of that is that the user expresses a need which causes us to provide some sort of information facility, it is because it has come from the user and not because the library has set out to provide it as a service. The expectation of my scientific colleagues is that in due course they will be able to do everything from a terminal on their desks.

E MCNAMARA (Trinity College, Dublin). We do provide an information service to government and other bodies in Ireland, and we feel we have a duty to do this because of the unique stock which we have as a copyright library, much of which is not needed by the majority of our students and researchers.

F. BLAMOUTIER (CNRS, France): We have tried to give a better service to academic users by implicating them in the compilation of our data bases. As producers they begin to understand the problems of users and *vice versa*. We have tried to establish networks where small teams of specialists can contribute to a co-operative system and this is one way of improving the service.

R HALL (Science Reference Library): If we go on-line to the exclusion of all else are we really saying that science started in 1965? Is this really what we want?

CLIFFE: No, of course not. Technology will be used but not by the end user in every case. There will still be an awful lot of people who will need to go back beyond 1965 and others who will never need to use on-line systems for other reasons.

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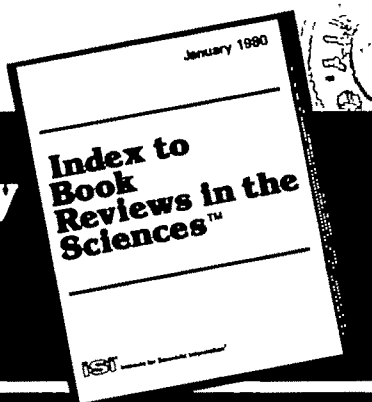
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Publications

One-man-operated—running an information unit for management in the public transport industry

Don Lee

Information Services Officer, Greater Manchester
Passenger Transport Executive

Paper presented to Aslib Northern Branch members on the occasion of their visit to GMPTE, 1 October 1979

As one of a small number of information people in Britain's public transport industry, the author feels that he has made innovations in the investigative outlook that he has introduced to his work. Following a general introduction to GMPTE he mentions some aspects of this work—such as arranging contacts, compiling surveys and co-ordinating ad hoc investigations. He concludes by speculating on what the future might hold for a one-man band information field-worker like himself, the information unit itself may become an unstaffed DIY contact point, run on basic principles anyone can use.

About GMPTE

Greater Manchester Passenger Transport Executive employs nearly 12,500 people and operates around 3,000 buses over 1,400 miles of roads throughout the county of Greater Manchester and into parts of Merseyside, Lancashire, Cheshire and Derbyshire too.

We also have responsibility for financing the local railway system which British Rail operates to our requirements

We are ten years old, formed in 1969 (and then called SELNEC—South East Lancashire and North East Cheshire—but renamed GMPTE upon local government re-organization in 1974) as a result of the Transport Act of 1968. This required us to bring together all the local council bus departments which then existed, often in splendid isolation, with the aim of 'developing integrated passenger transport arrangements'.

The workings of the PTE are ultimately controlled by the Greater Manchester Council through its Transportation Committee, so to that extent we are a self-contained segment of Greater Manchester Council

Information provision at GMPTE

The heart of the PTE's operation is the Hyde Road/Devonshire Street complex, where many of our various departments are based. I would like to place a particular emphasis on those which—in the widest sense—provide information, whether it be to management, to staff or to the public. This provision ranges thus:

- the designing, preparing and distributing of time-table leaflets to the public by the publicity officer;
- keeping headquarters in constant two-way radio touch with our bus crews on the road, to advise them of traffic and other problems and to summon help quickly in the event of disputes with passengers, the responsibility of the senior operations officer (Communications);
- the use of SCORE, the PTE's computer-based information system, which provides VDU access for management to service, costs, and revenue information;
- statistical and data collection techniques to help our Marketing and Operations Department in providing tailor-made bus routes to suit passengers, wherever possible;
- our new Training Centre, with its driver-training installations, its lecture/film theatres and its program of in-house staff training and management development facilities,
- the use of the 'Barbour' index of building regulations to help with the smooth working of the Property Services Department

GMPTE's Information Unit

Somewhere in this array of information provision is the Information Unit itself, which I manage. It is a focal point for many enquiries, and contains a small reference stock of books, journals and reports from world-wide sources, naturally with a bias towards public transport subjects. The usual bibliographic, journal circulation, indexing and current awareness services are provided in so far as time constraints allow.

The unit, established in 1974, has been and is intended to be staffed by only one person. We try neither to compete with any other library nor to hoard stock unnecessarily. However that has not stopped us from acquiring around 4,000 items in five years!

Nevertheless, the library side of the unit's work—though outwardly the most visible—accounts for only a portion of my time, and it is the other aspects, that will perhaps be less familiar to some information people, on which I would like to concentrate.

Arranging contacts

Managers—my basic clientele—want not merely published information but also quick contact with specialists in any particular field where their specific lines of research may take them, no matter how obscure. I endeavour to track down these specialists and put the two parties in touch, sometimes then dropping out but often maintaining a three-way advisory relationship as an information supplier to both sides. This leads to many interesting meetings and discussions in unorthodox areas, two absorbing involvements, for instance, are a recent environmental impact analysis applied to a public transport situation, and an examination of the present political climate's implications for the volatile circumstances in which public transport finds itself these days

Compiling surveys

The Information Unit is part of a huge Corporate Services department which is very much aware of the importance of Corporate Planning, so I have some responsibility there too. Since statistics is of necessity fundamental to the information service and to corporate planning, my little unit is part of the Statistical Services section for administration/management/financial purposes. One innovation, in public transport anyway, that Statistical Services has made in the last few years is our employment of market-research techniques for household surveys of housing estates and indeed of whole towns, where we are contemplating running new bus services or altering existing ones to meet shifting travel patterns, or where we wish to know how many people are likely to take advantage of planned public transport improvements such as bus/rail interchanges. As input to these surveys I compile a detailed geographical assessment of the locality in question, which helps readers of the survey report to get the feel of the area. Information field-work like this is not always thought of as the province of information people. Yet we are often in the best position to provide the maps, published reports and contacts which form the basis of general survey reports, so why should we not take the next step and provide a complete briefing service to users?

Ad hoc investigations

By profession a qualified insurance man, I worked for some years as an investigator/negotiator handling most types of insurance claims and court work. In 1970, I joined SELNEC, as it was then known, in the claims department, and it was the challenge of the possible application of my investigative techniques to information work that led me to the career-switch. Although totally new to conventional information/library work, with no direct experience, I found myself charged with running an information service for managers. Though Aslib courses have been invaluable to me in learning the theory, in practice, being on my own has meant constant innovation, improvisation, exploration and experimentation. One thing I set out to provide from the outset was a service tailored to individual managers. This may have meant an in-depth study, a field-visit, recommending services, or arranging discussions, often backed up by an investigation of available literature and/or details of current research—in other words, a complete package with information provision as a bed-rock but sometimes disguised by other features.

Maybe two examples—poles apart—will illustrate what I mean. One investigation request concerned a likely scenario of the public transport scene around AD 2000 which took me to the border-land of science fiction. Intensive three month schedules of visits and discussions with experts to explore the thoughts behind their written predictions, followed by a summary report, proved that information investigations are not all done from published sources; in this case there was no substitute for grasping at straws in the wind! In total contrast, another request came from one of our local district managers who wanted to run a new bus service to a country park and at the same time wanted ideas of promoting weekend family use of a couple of remote railway stations. I gathered a working group together to compile the resulting public-transport linked walks and information leaflets, again as a total concept. Nothing revolutionary perhaps, except that it was the Information Unit that co-ordinated it all,

making sure all the right people were involved and that the right information was on hand to assist the 'working party'.

Future development

Finally, how do I see the Information Unit developing? It will certainly change radically. With more basic information becoming cheaply accessible to more people via microprocessors, there will be little need for managers to use the physical unit for those simple requests they can obtain from their VDU. However they will still need information of the type that has to be gathered personally and which cannot be done by machines. Far from expanding the physical unit, I want to contract it to, ultimately, a desk/console, a comfy chair, a shelf of reference books for old times' sake and a notice board to pin up the latest items of daily doom from the media.

Nevertheless, in all this on-line sophistication with which we shall be deluged, there should still be in every information section something basic, helpful for anyone to understand when the unit is unstaffed, to give the client a clue to how to pursue an investigation. What I have in mind are the ideas of Tony Gibson's eye-catching 'Neighbourhood Fact Bank',¹ suitably adapted to our particular public transport situations and subjects. Indeed the Fact Bank could well form the future basis of many small information units, since the system is so simple that anyone can use it without help or training.

Summing up, I see an interesting and—functionally although not physically—expanding future for an increasing number of small information units or contact points where information workers get out and about far more and involve themselves increasingly in the issues of the outside world, leaving the actual information point as a tiny, unstaffed desk in what is certain to be a smaller office/works complex than we are used to today.

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Developments in word processing systems and their application to information needs

J. B. Whitehead

Pilkington Brothers Limited

MANY YEARS AGO, when I was a young student, I remember listening to an eminent librarian of the day relating the story of a visit he had received from a work study team. After studiously checking all the library systems and processes they very seriously suggested that the librarian would save time and money if he stopped the typing of catalogue cards and hand wrote each one. That team, needless to say, was never invited back.

That scene was enacted only a few short years ago and yet here we are using and accepting electronic systems in libraries and information departments as though to the manner born. The use of computers has, I suppose, been adopted much more slowly in our profession mainly because of the cost involved. To a great extent, only the larger corporations could afford to use such sophisticated equipment and even they were invariably confined to time-share facilities.

But times have changed and with the increasing use of microprocessors and their reducing price we are finding that very sophisticated equipment is now becoming more readily available to the information world. The UK, unfortunately, has been slow in adopting the new microelectronic miracle and we have had to rely, to a large extent, on American technology. Good news came, however, on 6 December 1978 when the then Prime Minister, Mr James Callaghan, announced a £100 million Government-aid scheme to support a UK Microelectronics Application Programme. During his announcement Mr Callaghan said, "The subject of microelectronics is of critical importance to the industrial future of the nation. 1978 has to be the year when Britain woke up to microelectronics!"¹

Most information workers are familiar with the use of computers in the information field, whether the on-line service facilities of Lockheed, SDC, BLAISE or what-have-you, or the increasing number of in-house computer services being offered today. The IBM STAIRS software programme, for example, is being used by many organizations in this country and overseas.

Pilkington Brothers, in common with most large industrial concerns, experienced acute problems with its information requirements some years ago. As far as the external information sources were concerned, the company joyously jumped on the bandwagon with many other similar organizations and took advantage of Lockheed's foresight and enterprise and started to use DIALOG for searching. That was just as quickly followed by SDC's ORBIT, British Library's BLAISE and we were the first in Europe to use BI/DATA, Business International's hard information data base in

New York. It is also hoped, of course, to use EURONET's DIANE when the system becomes available.

Those services solved many problems but did not alleviate one major and very pressing need—the need for a mechanized storage and retrieval system for internally generated information. With a large annual input of technical reports plus a mixture of working party minutes, company and product surveys, market research reports and many others it was found that the old co-ordinated indexing systems could no longer cope with requirements, especially as they were labour-intensive in both input and output.

So, like many others, Pilkington turned to the computer and a number of commercially available software packages, including IBM's STAIRS, were carefully studied before it was decided to commission the software from the Company's own computer people. The programme has now been in operation for about eighteen months producing a monthly *Reports Bulletin* and undertaking literature searches. However, the mainframe facility at Head Office is heavily used and our priority is relatively low.

Consequently, it was decided that alternative methods of internally storing and retrieving information should be sought. In February 1978 a Vydec 1400 Text Editor was installed in the R & D centre on a three month trial basis. The purpose of the trial was to assess the capabilities of word processors to the full and it was so successful that the Vydec was retained and two further machines, AES Plus software-based machines, manufactured by AES Wordplex Limited, were acquired.

I Word processing developments

A. The evolution and characteristics of word processing

The question many information workers will ask is 'what is a word processor and how can it help me?' To answer that question I would like to quickly describe the equipment and the way it developed.

Word processing started with the invention of the typewriter more than 100 years ago. Over the years, a number of improvements were made to the operation of typewriters but they still retain some of their important original characteristics. The UK keyboard layout, known as QWERTY, is still the standard, for instance. The layout was originally designed to slow down the typing operation to prevent the type-hammers from locking. When you consider that the main aim to-day is to speed up that typing operation it seems ridiculous to persist with such a layout especially when keyboards no longer operate through type hammers. The reason, of course, is that all typists are trained to use QWERTY and the cost of re-training would be enormous.

A further advance was the introduction by IBM in 1961 of the Selectric 'golf-ball' typewriter. The change to a single print-element, shaped like a golf-ball, which resulted in the ability to have several type styles available on one machine, along with an excellent quality of print and the relative robustness of the sophisticated printing operation were all particularly significant advances.

The first real move towards word processing, however, came in 1964 when IBM announced the Magnetic Tape Selected Typewriter Mark I, the first automatic typewriter to include a magnetic memory. The MTST was soon enhanced to include

a second memory, so that considerable flexibility could be achieved by reading a previously prepared text from one memory, editing it from the keyboard and then producing the final text on the second memory

The automatic typewriter style of production had, however, certain inherent limitations. In particular, the typist could not see the final text as it was being produced and, therefore, could not be sure that any amendments were being made correctly. This problem increased with the complexity of the amendments and corrections required.

These limitations were overcome by the introduction of word processing systems which included visual display units. The effect of the typist's keying operation was apparent immediately from the text shown on the display. Although word processing systems incorporating a display unit are typically an order of magnitude more expensive than the automatic typewriter kind of system, the fact that they are economically viable at all was due to the rapidly falling costs of technology developed primarily for computer systems. In general, further borrowing from computer systems technology can be expected in the future and this trend is already apparent in the more sophisticated word processing systems now available.

The advent of the electronic memory

Two years after the arrival of the magnetic card-based word processor, equipment with a significant amount of electronic memory, equal to a kilobyte or so, made its first appearance. The combination of these two innovations changed the nature of text editing and played a significant part in determining the direction in the development of this type of equipment. The first commercially available machine to incorporate a 'large' electronic memory was the screen-based Auroscribe, produced by Lexitron in America

The introduction of screen-based systems

The next major development in word processing came in 1971 when Lexitron produced the world's first commercially available stand-alone CRT-screen based 'soft-display' word processor. The new technology brought no striking advance in what could be done on word processors. The difference, this time, was in the enormous improvement in the ease and simplicity with which the operations could be carried out.

B. The components of a word processor

The keyboard

All word processors have a keyboard which includes, apart from the usual alphanumeric character set, a number of control keys permitting editing functions to be carried out. The logic which implements the editing functions is normally contained in a microprocessor.

The screen

Not all word processors have screens, although the trend is increasingly to have them. The simplest and cheapest type of screen displays just part of one line of text, the one being typed, while some screens, by contrast, display a full A4 page.

Most screens have an area, usually at the top, reserved for the display of control information such as the name of the current job, the function being carried out, the setting of tabs and margins and other information useful to the typist.

The print unit

There will always be a print unit, which may be attached to the keyboard as with a conventional typewriter, or which may be a physically separate unit. The most common print units are the golf-ball printer, as on many conventional typewriters, and the daisy wheel printer. On both types the print element is removable so that a variety of character sets and type fonts are potentially available. The daisy wheel printers are generally two to three times faster than the golf-ball variety.

Storage

Modern word processors always have some form of magnetic memory to record typed information. The most common form today is the floppy disc or diskette and these usually have a capacity ranging from about 70,000 to 500,000 characters or from fifty to 250 pages. One big advantage of discs is that text can be retrieved directly from anywhere on the disc and can also be transferred to and from the disc relatively quickly. When being used, discs are attached to the system on disc drives, of which there are usually one or two, but occasionally three. The number of disc drives determines the number of discs which may be in use at any one time.

Alternatives to the floppy disc are magnetic tapes, contained in a cassette or cartridge and magnetic cards, with a capacity usually of 5,000 or 8,000 characters. Some of the larger word processing systems, however, have 'hard' discs as a storage medium. These are the discs conventionally used on computer systems and have a much larger capacity and faster access time. Shared logic word processing systems, for example, have hard discs with a capacity of from ten megabytes upwards, or 10,000 pages or more of A4 text. On some systems the user may have a choice of storage medium or be able to use more than one medium in combination.

Logic

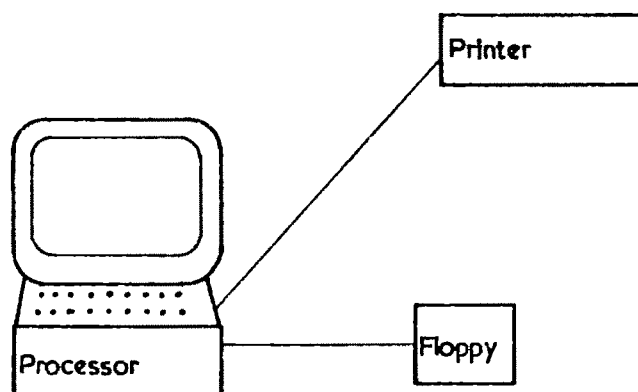
It is the logic word processors which provides the various functions, such as editing, storing and retrieving text, and controls all the components of the system. In all systems, some of the logic is in the form of hardware. On most modern systems, however, much of the logic is in the form of software computer programs fed into and stored in the internal memory. The programs are executed by a microprocessor when the typist indicates that certain functions are to be carried out by depressing the appropriate keys. The particular advantages of software is that it can be changed more cheaply than hardware and the supplier is therefore able to enhance his systems more easily. This also means, in some cases, that users are able to write their own programs for the system if they wish. The software programs also allow the word processors to communicate with each other and to also act as computer terminals for direct access to mainframe facilities. Software programs also provide the storage and retrieval facilities so important to the information worker.

Stand-alone and shared logic systems

Reference was made earlier to shared logic systems and I would like to explain the

difference between shared logic and stand-alone word processing systems. A stand-alone word processor is a self-contained word processing system (Fig. 1). It consists of a keyboard, with or without a screen, a print unit and some form of storage. If the user's requirements exceed the capacity of one word processor, an option is to increase the number of stand-alone units. It may be possible, if there is a need to pass information between the word processors, for them to be linked to do so via a communications mode

FIG.1 STAND ALONE—SYSTEM



It is likely, however, that as the user's requirement grows, it will not grow uniformly for all the components of the system. It may also be more cost-effective to have a hard disc to service several keyboards rather than a number of individual floppy discs. The rationale behind shared-logic systems is to enable different numbers of given components to be used in combination.

Various forms of shared-facility system are possible, as shown in Figures 2-5. In Figure 2, there is no physical link between the work stations and the printer, and discs with text to be printed are transported manually to the printer. Figure 3 shows several work stations which are connected, via a switch, to a printer. Figure 4 shows a shared-facility system which shares logic, as well as the discs and the printers. A system such as this is likely to be controlled by a minicomputer. Figure 5, on the other hand, shows a work station which may be operated in a free-standing mode but which is also linked to other facilities which it may share. These are examples of only some of the possible configurations. On systems which may share facilities, the range varies between a restriction to a maximum of two work stations which may share only a printer to thirty or more work stations sharing most or all facilities.

Searching

Many word processors are capable of searching their data store, whether on floppy or hard discs, and can then display and print the information retrieved in any sequence. Usually the word processors require a software program to access the information. These programs were not specifically prepared for information workers but were

FIG.2 SHARED PRINTER SYSTEM

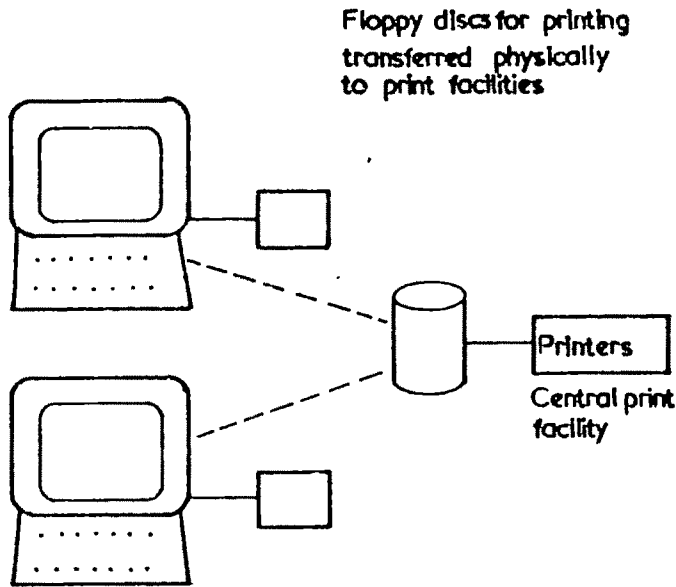


FIG.3 SHARED PRINTER WITH COMMUNICATIONS LINK

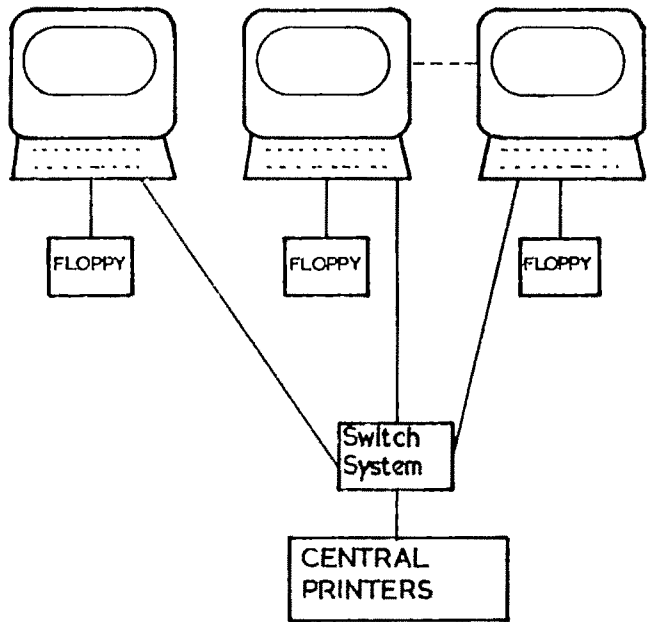


FIG. 4 SHARED LOGIC SYSTEM SUITED TO
TYPING POOL CONFIGURATIONS

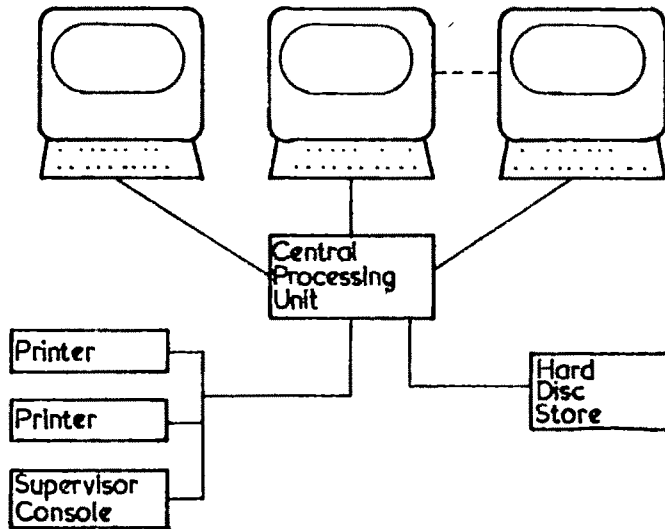
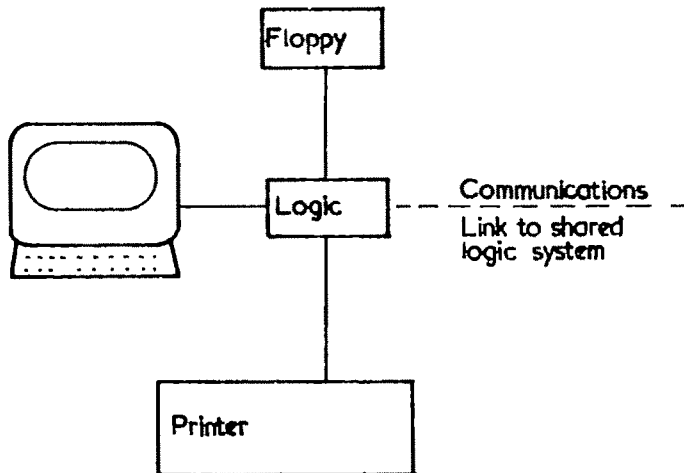


FIG. 5 REMOTE WORKSTATION



developed for such administrative functions as personnel searches—searching for the right shaped peg to fit into the right hole. From personnel files a personnel officer can, for example, search for a physics graduate aged between twenty-six and thirty-five with experience in production and research and development, to fill a vacancy in a production plant. Another example is the in-house telephone directory which can be changed regularly with no fuss or bother by extracting or adding names and numbers from the files; or from a list of individuals, you can select those who wish to receive specific information. This program is ideally suited to information needs and allows search patterns using key words to access the stored data in a similar manner to a computer. You have available, therefore, a miniature version of Lockheed's DIALOG using the system to store and retrieve your own information without going to the expense of buying a computer.

C. Text storage

I would now like to consider in more detail the text storage facility of word processors and the manner in which they interpret the data stored. The considerations relating to the storage part of a word processor are the capacity available to hold information, the security of that information and the method of filing and indexing it for retrieval. The total information capacity of a system can affect the size of a document or documents which can be manipulated at any one time, although the relationship between this size and the total storage capacity can be difficult to ascertain. However, the maximum storage capacity is a useful figure to know, if it can be established.

For security reasons, it may be necessary to copy files or to protect them from alteration. It may also be desirable to retain a copy of the original text being edited and there can be considerable and often surprising variations in the abilities of word processors to do this.

Interpreting the data: storage capacity

The storage capacity of word processors is made up in general of a small amount of internal memory holding some or all of the system software—if the system is software-controlled—and probably about a page of text, plus the backing storage in the form of magnetic tape or discs.

The difference between the total storage capacity and the text storage capacity is partly accounted for by the space taken up by system software. In a stand-alone disc system, for example, the system software will be provided on a system disc which would be placed in the disc drive before any work was started. If all the software can be held in the internal memory of the word processor, the contents of the system disc are read into the internal memory and then the system disc removed. This allows the total disc storage capacity to be potentially available for information storage. Alternatively, only part of the system software may be held in internal memory, in which case the system disc must remain on the system and only part of its capacity will be available for storage. However, this can be compensated on dual disc drive equipment by adding the capacity available on the disc in the second disc drive unit.

Interpreting the data: text security

Where it is necessary to take security copies of stored files, this can be done on most

systems provided they have two disc or cassette/cartridge tape drives. The files are then copied from one disc to another on the second disc drive.

Stored information can also be protected against inadvertent or unauthorized alterations. On most systems it is possible to protect a whole disc or tape in this way, although the point is worth checking in any particular case if it is important to you. It is not possible generally to protect part of the text on a disc or tape except by software. This may mean wasting storage or grouping sensitive documents together and if you take the latter course, it is worth remembering that if you lift the protection to add another document, the documents already on the disc or tape are unprotected as you do so.

Interpreting the data: directories, housekeeping

Some systems help you more with the organization and retrieval of text than others and you may be surprised at the number of ways in which you will want to locate text. The cost of storage is a serious consideration in any system so a text compaction facility is useful, and so is any help you can get in having 'old' text signalled for deletion when or if it is no longer required. Some systems have housekeeping software to make required deletions automatically and re-organize the remaining text so that free areas on the storage medium are grouped together and not left fragmented. Some systems also indicate the amount of space a document occupies and the amount of free space left on the medium. It can be particularly annoying to start entering a document and then find that there is insufficient space available on the disc. So when you wish to store a document you need to know that there is space on the store medium for it. Similarly, when you wish to delete a document you do not want the space created left as a gap between other documents.

If there is no filing software on a word processing system, users have to provide the information themselves. A record of the information stored has to be kept and any adjustments made have to be noted. Fortunately, some systems ask the user for the essential information and deal subsequently with the physical placement of records, the shuffling of space and the creation and updating of directories. They may also tell you how much space they have used and how much is left. Most word processing systems perform at least some of this.

Some systems ask for a lot of information, to be helpful, but then require you to re-enter all information if you wish to change any part of it. The ideal case is for the system to do the maximum on the basis of minimal information for the user, while allowing the user to over-ride or modify any part of its automatic filing functions where appropriate.

II Word processing in the information field

A. Word processing application in information

The areas where word processors can be of benefit to information workers can be summarized as follows:

- library catalogues—access by author, title or subject and automatic production of book lists by author, subject, date of acquisition, etc.;

- order processing—constant check available of items outstanding and the equipment will produce standard letters requesting progress on orders;
- abstracting and indexing bulletins—input of bibliographical information which can be stored, sorted and printed in any sequence;
- on-line searching—internal and external data base access using the word processors as computer terminals; store and edit input as required;
- communications—word processor-to-word processor communications providing electronic mail facilities and offsite access to the data stores;
- borrower records—global search and select up-date facilities will provide up-to-date record of all loans and borrowers;
- periodicals acquisition—provision of constant check on periodical acquisition and location of each issue on circulation.

The growth in this area is rapid and information workers must be prepared to adapt themselves to such systems very quickly. The system will not be confined to the conventional information areas and it is important that we take the lead in the development within our own organizations or we could finish up as part of a system rather than operating it.

B. Systems in use at Pilkington Brothers Ltd

In February 1978 a Vydec 1400 Text Editor word processor was installed in the Pilkington Research and Development Laboratories on a three months trial and that machine is now operating at full capacity. It was later decided that the equipment should be made available to all typists on site and a member of staff was trained by Vydec to provide all the basic training for the people who were using it.

The first problem came when managers started to complain that their typists were disappearing to the word processing centre to use the machine and they were left with no secretarial services. To install a word processor in each work area was not considered a viable proposition so, to solve the problem, an OCR Typereader was installed. This machine will read text typed by the typists on their own typewriters and then transfer it to the floppy discs of the word processor. This meant that input to the word processor was available to all typists who had an IBM golf-ball typewriter so that all initial drafts could be typed locally and only the editing and correcting undertaken on the word processor. This saves 60 per cent of the time spent on the word processor itself and considerably extends its use.

The next development was the incorporation of a communications link. Using a Post Office telephone and a modem we were able to program the Vydec to transmit any information stored on floppy discs to a similar machine at Head Office. Electronic mail had arrived and we found the Vydec particularly useful as a telex link.

The demand for time on the Vydec became so heavy that a second machine had to be acquired, but this time an AES Plus, manufactured by AES Wordplex Limited, a Canadian-based company, was purchased. This machine is software-based with a random access memory and it is programmable, which gives it a number of advantages:

- As well as the normal text editing facilities it could also be used as a computer terminal for accessing both the in-house main frame computer and also external services such as Lockheed and SDC

- It could be used as a small stand-alone computer using software supplied by AES. This was found particularly useful for preparing the R & D budget and, for this purpose, we eventually invested in a second AES Plus machine.
- It could communicate not only with other AES Plus machines but also other compatible word processors.
- It had A3 facilities, including the printing of larger sized documents.
- Computer prints were in conventional type faces

By using a word processor to access external data banks we could have an editing facility which we never had before. Our customers had become used to Lockheed and SDC prints but many were still baffled by some of the information, printed with each abstract, which the information staff needed but which was not necessarily of use to the customers. By searching the external data banks and then storing the retrieved information on the word processor floppy discs, the information could be edited at leisure once the search was off-line. The print-out then given to the customer would be equivalent to an IBM golf-ball carbon ribbon typescript.

Some word processors can be programmed to store information and retrieve it in any format. This is an ideal medium, for example, for producing indexing and abstracting bulletins automatically. As journals are scanned the bibliographical details of each relevant paper can be fed into the word processor, plus any key terms needed to identify it, and then forgotten until required. The equipment can then be programmed to print out the file in any sequence, whether it is subject, author, title, classification number or type of entry. Production time for bulletins is reduced considerably. The information on the disc storage facility can then be retained on file, wiped or transferred to a mainframe storage facility.

One of the main disadvantages of the system is the limited storage capacity of floppy discs. At present the maximum that can be stored on any one disc is sixty pages of A4 text—and no drawings, photographs or illustrations. However, the new shared logic systems are now available and consideration is being given to which of these facilities will more readily supply the needs of the department in future.

As we see it the programme of development will be as follows.

- At present we have the direct access to a word processor system plus access from IBM golf ball typewriters through the OCR Typereader.
- We have direct links to internal and external data bases and also the communications link to other word processors around the Group.
- The next stage will be the installation of a shared logic system with a large capacity hard disc store and a central processing unit access by a series of word processing work stations each feeding information into the store and each able to access that information.
- In addition, managers will be able to access the store themselves using small visual display units on their desks.

The storage capacity of shared logic word processing systems is immense and can be increased by adding further hard discs in series. The capacity of one disc is anything from ten to 380 megabytes, or well over 150,000 pages of A4 text at the top end. With this system it is possible to store not only the abstract and the basic bibliographical details of reports and papers, but the full texts of those papers. All the information

generated on site, whether reports, letters, manuals, telephone directories or even budgets and accounts can be stored, retrieved, altered, amended and updated. By using archival discs the information no longer in current use can be transferred for permanent storage but can easily be retrieved whenever required. The one basic problem is the editing out of extraneous and ephemeral material which does not require permanent storage. This is an area where the information specialists will come into their own.

C. Systems in use in other information centres

Dr P. W. Williams, of UMIST, presented a paper at an Aslib Midlands Branch meeting in October 1978 which clearly identified the potential uses of microprocessors in library and information work. In his conclusions, Dr Williams advocated a careful analysis of the microcomputer systems available for such applications, having highlighted such potential areas as borrower checking systems, loan systems, library catalogues, borrower mailing systems, and an order processing system.² Some of the word processor systems have been analysed and are being used or tested in a variety of information areas. For example:

South East Thames Regional Library and Information Service

Using a BDP 90-02 Word Processing System, the South East Thames Regional Library and Information Service is maintaining an efficient and economical indexing system to the Sussex Postgraduate Medical Centre Library and thirteen other libraries in the South East Thames Health Authority Region.

Each of the libraries in the region is responsible for ordering its own books and, where titles were duplicated, classification and cataloguing were also duplicated. By installing a word processor a number of the libraries were able to take advantage of the centralized, automatic production of high quality standardized catalogue cards.

When a new book is ordered by any of the fourteen libraries a check is first made to see if it has already been recorded on the word processor store, which stores around 250 titles on each disc. If not, the relevant information about the book is fed into the store and when required five catalogue cards are produced automatically by the BDP which are then posted to the library and the disc is returned to store.

The time taken to produce the cards is greatly reduced and the cards themselves are of a uniformly high quality. The equipment is now being considered for the production of a union catalogue of journals within the system. The system was devised by John Mills, the Regional Librarian.³

British Ceramic Research Association

BCRA produces a regular abstracting publication called *British Ceramic Abstracts* and for years it was produced in the conventional manner using letterpress printing. In the 1960s, however, the heavy cost of printing forced BCRA to revert to camera-ready copy produced by IBM golf ball typewriters, which was then printed by offset-litho. First attempts at using word processing equipment were in 1971, using one which prepared a punched paper tape. In the meantime, considerable developments were taking place in the computerized handling of information and computer technology in general and the BCRA consequently switched to a Data Recall Diamond, or Data

Input *Amended on Disc*, word processor which used the floppy disc type of storage referred to earlier

Each floppy disc holds 120 A4 sized pages of text and, in addition, also carries the program which controls the operation of the equipment.

The system operates in two ways:

straight forward input and editing;
text sorting and searching which extracts relevant portions of the text for the production of the abstracting journal.

As a result of this development BCRA can now input abstracts to the word processor, edit and sort them and then store to await the monthly publication of the *Abstract Bulletin*. As well as producing the bulletin in any sequence they desire, the word processor will print index cards, produce special topic selective bulletins, and update each monthly bulletin to produce an annual cumulation complete with author, subject and title indexes. BCRA information staff will soon be in a position to undertake machine searching using author or key words for subject searches.⁴

National Reprographic Centre for documentation

The British Library has granted a sum of £27,000 to the NRCd to install a word processing system in order to determine the benefits of the equipment to specialized information centres and similar institutions.

The NRCd will explore a number of areas where the value or practicality of word processors can be considered including:

information retrieval—investigation of the scope for providing a limited form of automated information retrieval from NRCd abstracts;
computer output microform—investigation of the feasibility of transferring data from the word processor disc stores to tape suitable for driving COM recorders.

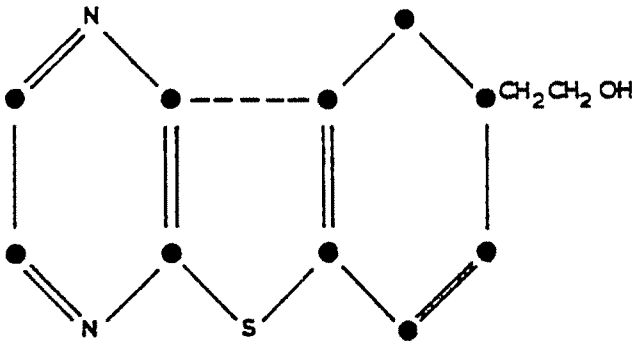
The British Library has set a high priority on the reporting of results via publications and short courses and liaison with other related work. The equipment purchased was a Wang 25/2 which has a storage capacity of around 1000 pages of text.⁵

ICI Pharmaceuticals Division

An interesting and very worthwhile enterprise produced by Vydec in conjunction with ICI has been the development of a system for handling complex chemical structures on the word processor.⁶ Detailed diagrammatic chemical structures can be built up piece by piece or the commonly used structures can be stored in the memory and recalled at will by the operator.

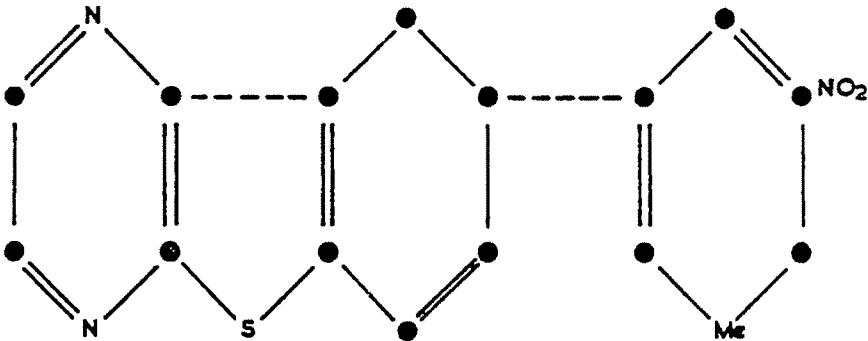
This means that mixtures of text and chemical structures can not only be stored and printed but can also be communicated to any other compatible word processor anywhere in the world. Normal chemical formulae, such as H_2SO_4 , pose no problem for word processors—nor do structures which exist as chains. The problems came when ICI wanted to input structures containing rings, such as.

Structure 1



The ring part of this structure has been created and stored together with a tabulator program which enables it to be positioned at will. A benzene ring can, for example, be brought from store and added to the first structure to form structure 2

Structure 2



III Future developments

Most of the more advanced systems now available have been released within the last two years. Unless circumstances dictate otherwise, their suppliers are unlikely to introduce new equipment to make those systems obsolescent before they have established a sufficient user base to justify their original manufacturing and marketing costs. In any event, those systems generally provide a suitable growth path for the more experienced existing users. There are, in addition, a number of possible developments in terms of attachments, interfaces and new software with which suppliers could enhance their systems until they can provide new series of models.

Other new and interesting developments include:

Intelligent copier printers (ICPs)

High performance word processing printers are now available which can print high quality material with a choice of fonts; can communicate information in the send

or receive mode; can be directly connected to word processing terminals, can receive information over the telephone lines or by magnetic card or floppy disc, have a remote batch or on-line send/receive printer; or can be used as centralized, large mainframe printers. These include the Xerox 9700, the WANG ICP and IBM's 6640 and 6670 models. The Xerox includes a computer operated microfilm facility controlled by a DEC PDP/11 mini-computer.⁷

Bubble memories

In 1977 Texas Instruments announced the availability of a 250,000 bit magnetic bubble memory. Bubble memories provide non-volatile, medium speed data storage at a price close to the floppy discs presently in use. In June 1979 Intel announced the availability of a mega-bubble with a one million bit memory. The introduction of bubble memories into word processors in the future will increase their storage capacity tremendously and these new devices will also provide a rapid access to this vast store of information.⁸

Photocomposition

Wang Laboratories of America recently announced a photocomposition system configuration on their Word Processing System which is connected on-line to a Typesetter photocomposer through an interface translator. Consequently, any document which has been edited and filed on the Wang Word Processing Systems can be immediately typeset for printing. The system will offer over 250 different typefaces with point sizes from six to fifty-four. Another development from Wang is the Intelligent Image Printer which combines word processing with a plain paper copying process to form a revolutionary type of data and word processing peripheral printing device. It will have an output rate of eighteen pages per minute—compared to a page every 1.5 minutes on a normal word processor.⁹

Viewdata/Prestel

With a local telephone call the owner of a television set suitably adapted can gain access to the Post Office Prestel service which stores information and programs on the Post Office computer. Millions of pages of information will be available ranging from news reports, films being shown locally, weather forecasts, stock market movements and large amounts of business information. With the advent of systems such as the Philips Viewdata System, access to Prestel can be through a word processor computer terminal or VDU as well as the domestic television receiver. The implications for the future are enormous. Internal information storage linked to an internal Viewdata System with access to the increasing number of external systems will give the managers of the future immediate access to a vast range of information.¹⁰

There are a number of further developments in the pipeline including the input and storage of drawings, diagrams and graphs which will further increase the application of word processing in the information fields.

Conclusions

This has been a quick appraisal of what is happening in the word processing field and an introduction to the investigations some information centres are carrying out into the applications of word processing in information work. New equipment, such as Wang Laboratories' recently introduced VS word and data processing systems, the

Wordplex 4 and 7 developed by AES Wordplex, and the large capacity systems developed by Philips and GEC for use as internal Viewdata systems, are going to provide information workers the world over with a very exciting future.

NOTE

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Training social services staff to make better use of information: two practitioner-training courses and their implications

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PROJECT INISS IS a Sheffield University-based research project originally established with funds from the British Library to investigate information needs and services in local authority social services departments.¹ Further funding, from the Department of Health and Social Security, enabled the project to undertake a programme of information innovations in departments. One of these involves developing training courses in information handling and related skills.

The training courses described here were the result of collaboration among Project INISS, the Travelling Workshops Experiment (TWE) and West Devon Social Services Department. The TWE is based at Newcastle Polytechnic and has been running training courses and producing materials to train social welfare students (and other student groups) in the use of libraries and information, again with British Library funding.² This collaboration offered the chance to investigate the extent to which TWE methods could be applied to practitioners.

West Devon Social Services Department was involved in earlier phases of Project INISS work and has an active training section. An existing commitment to a major programme of training for all the senior and middle management staff provided scope for a collaborative approach which could overcome the traditional but unhelpful tendency to treat information services in isolation from their organizational context.

The West Devon courses

Planning for the two training courses commenced in October 1978 and was undertaken by a steering group with representatives from county headquarters, the training section, the intended audience and Project INISS. The courses were envisaged as covering leadership, inter-personal relations, communication and information handling, with the last two elements being undertaken by Project INISS. In the event the co-operation

among contributors was considerable and was heightened by the growing involvement of the TWE. The TWE representative took a largely supportive/fact-finding role in the first course in February 1979 but was more directly involved in the second course in March 1979, as described below.

Both courses lasted for a full working week of five days, and fifty-six people, over 85 per cent of the senior and middle management staff in West Devon, completed one or other of the courses. They included area-based advisory staff, all three divisional directors, social work team leaders, divisional advisory staff, area and divisional administrators, day centre managers and managers of residential homes. A brief outline of the first course is given below:

Module 1: *Inter-personal relationships and problem solving*

After a brief introduction participants were asked to select their priorities from amongst the stated course objectives, at first individually and then in groups. A short presentation summarizing the results of a pre-course questionnaire completed by participants was followed by a simulated dialogue exercise, performed in pairs. A brief 'ice-breaking' activity was introduced at the start of the second course.

Module 2: *Leadership*

Each participant completed a questionnaire designed to reveal leadership style, before being introduced to aspects of transactional analysis likely to be of use in a leadership role. A role-playing exercise, involving allocation of offices within a social work team, was performed by some of the participants; after discussion this was followed by a small-group problem-solving exercise.

Module 3: *The organization and the individual*

A film about effective organization of meetings was followed by more detailed consideration of the theme in groups. On the second course, the film was shown after the groups had reported back. This increased the impact of the points made in the film with the result that it was shown again at a later Area Management Team meeting. The Project INISS view of social services departments as communication systems was presented and discussed and leaderless groups were then called upon to solve problems.

Module 4: *Using information*

Described below.

Module 5: *Looking at Devon*

Described below.

Module 6: *Leadership, inter-personal relations and communication: decisions*

Group discussions of the key issues which emerged during the week led to specific proposals about what should be done in Devon.

One day each was devoted to modules 1-4 and modules 5 and 6 were allotted half each of the final day.

As will be clear from this outline, great emphasis was placed throughout upon group activity and experiential learning. This was conditioned both by our view that sharing information is an important aspect of leadership and inter-personal relations and by our expectation that participants would learn as much from each other as in the formal presentations.

The remainder of this report will focus upon modules 4-6 of the courses in which attention was focused upon information use.

Using information

The connections between leadership, inter-personal relations and communication issues were emphasized throughout both courses but attention was increasingly focused upon individual information handling skills. Module 4 commenced with a brief examination of some specific problems which had arisen in other social services departments (as reported to Project INISS) and looked at the steps taken by staff to obtain the requisite information. Course participants discussed their opinions about these actions taken 'in real life'. Several participants commented on a disquieting tendency to treat the responses of national-level specialist organizations as though they were the complete answer to requests for information. These sessions served to emphasise the extent to which social services staff rely upon informal contacts to obtain information and the difficulty of establishing whether anything like adequate information was being obtained.

Participants on both courses had been asked to complete and return a pre-course questionnaire (based on a self-completion questionnaire designed by Henry Mintzberg³). Questions covered management style, work pressures, relations with other staff and information use. Forty-six of the sixty-five people who had accepted places on the course responded to the questionnaire, a response rate of 71 per cent.

The response to one question was of particular interest here. All but three respondents (who reported being 'uncertain') felt that they 'should spend more time reading and probing deeply into certain issues.' In view of this response, participants on the second course were asked, at the beginning, to specify a work-related subject which they wanted to read more about. After a brief presentation intended to suggest ways of systematically seeking published information, time was made available, in module 4, for participants to follow up the subjects which they had specified. A number of reference books and other bibliographical tools were assembled for this purpose and explanatory posters (prepared by the TWE) were provided to show participants how to use some of these. Preparation for this session had involved the authors of this paper in 'vetting' the chosen topics, with the help of the Local Government Librarian for Devon County, to ensure that adequate reference sources were available and to suggest lines of enquiry. As well as encouraging participants to use information sources, this activity allowed people to 'go away with something tangible'.

Group information-seeking

The remainder of module 4 consisted of a group information-seeking activity and a feedback session. Most librarians will be familiar with the type of individual information

search exercise carried out by students in reference libraries. Several factors suggested that a *group approach* would be more appropriate in this case:

- the relatively senior status of the participants, who might have objected to 'meaningless' searching or random browsing;
- the need to reinforce the potential value of published material in overcoming the kinds of problems often encountered in meetings;
- as already stated, the organizers' desire to stress the inter-relationships amongst the course themes;
- a wish to provide participants with a realistic problem on which to practise their developing skills;
- the fact that participants all had some previous experience of problem-solving in small groups.

Four cases on information-seeking were prepared in which the groups were called upon to:

- prepare for a meeting with a group of film-makers with a view to making a film about intermediate treatment;
- plan a social services contribution to a forthcoming careers fair;
- be prepared to counter criticism from elected members that the department's procedures for dealing with suspected cases of non-accidental injury to children were less adequate than those in another specified local authority;
- plan a local permanent exhibition of aids for the disabled.

At the outset it was stressed that the activity should not be seen as a role-playing game but as an exercise in seeking and taking decisions about information. No previous knowledge of the subject areas was required but some advantage was obviously gained by a group if they had a 'real life expert' in their midst.

Participants were arbitrarily divided into four groups, each to attempt one version of the activity. Sets of 'game rules' were given to each player, together with short statements of the background to their problem and the task to be performed. The collection of publications described above provided the main information source but this was extended by means of a series of envelopes containing published material which was intended to simulate the type of response likely to be received if a group member contacted a national organization or expert. Chairmen of the groups were alerted to the possibility of using these envelopes if appropriate organizations or individuals were mentioned by other group members. (It should be noted that this approach becomes disruptive if the alerting role is assigned to group members other than the chairman.) Chairmen had a little difficulty in assimilating the additional information supplied to them but were quick to recognize that this is not an unusual situation in reality. A period of ninety minutes was allowed for the activity (rather less than on the first course) and this proved to be a comfortable time in which to complete each of the tasks.

It was noticeable that with the advantage of previous individual exposure to the publications supplied for reference (obtained when looking for information on their own topic), participants on the second course were much less reluctant to search for the information which they felt to be necessary and tended to approach particular

publications (such as *Social Service Abstracts*) in the expectation that they *would* find what they wanted.

Local resources

Module 5 on both courses opened with brief presentations from spokesmen from the public libraries department, the county information and research unit, and the department research section, preparing the way for group discussions about information requirements in the county. The final module was devoted to some of the more general issues which emerged from each course and to the actions which participants saw as necessary.

Reactions to the courses

The general reaction to both courses was favourable, judging by comments received or overheard. In the course assessment questionnaire, described later, respondents were asked to what extent the course met their expectations. Some of their replies are given below:

- 'More useful and practical than expected'
- 'As the week went on more and more of my expectations were met. In terms of communicating and meetings it will be a good basis for further learning about these subjects.'
- 'It gave me a much needed slant on leadership. It was of value with a view to meetings'
- 'Overall, informative and useful. Not quite as 'high powered' as I, personally, would have wished. Patchy in parts but having regard to the size and mixture of group understandable.'
- 'I found the course refreshing but would have preferred less games and more examples of day-to-day problems. Information seeking was excellent.'
- 'It gave me a self awareness of my role in the department also a fresh look at the role as a whole.'
- 'An excellent course, well planned.'

What the courses achieved

Comments led the organizers to believe that the courses were largely successful in meeting a series of previously specified objectives. In the areas of communicating and handling information, these were that at the end of their course students should be able to.

- (a) understand the importance of effective communication of information within the department;
- (b) identify a variety of factors likely to inhibit communication of information within the department;
- (c) identify a variety of factors likely to enhance communication of information within the department;

- (d) make more effective use of a range of information services, both inside and outside the department;
- (e) make more effective use of a variety of information resources available to members of staff,
- (f) organize appropriate storage and retrieval systems for use in the office.

When asked in the final session to specify the two most important things that group members had learned on the course, six of the eight discussion groups singled out knowledge of sources of information and four picked perception of organizational efficiency in terms of effective use of information. In the month following completion of the second course, requests from West Devon Social Services for inclusion on the mailing lists for Local Government Library publications doubled to a new total of thirty.

Questionnaires were distributed after each course in an attempt to assess the reactions of participants. Perhaps predictably, given the known preference of social services staff for oral and informal communication, the response rate to this questionnaire was rather disappointing at 52 per cent, (although, at the time of writing, follow-up procedures had not been completed). It cannot be assumed that the participants who failed to return this assessment questionnaire share the views expressed below but the responses made to certain relevant questions were as follows (the numbers in the boxes indicate the number of ticks):

Please look at the course objectives and indicate to what extent these were met by ticking the appropriate box:

Totally successful Totally *unsuccessful*

Was the part of the course on communicating information

Totally successful Totally *unsuccessful*

(One participant did not respond.)

Was the part of the course on using information:

Totally successful Totally *unsuccessful*

(The low score comments were respectively. 'I would have preferred to condense this section and expand the others;' 'Boring and generally went on too long,' 'I disliked the game and my group.')

Some comments made about the communication and information handling modules illustrate the reasons for this overall response (with allowance for the 'halo effect' associated with a novel and enjoyable week's activity).

- 'One realized how essential it is to communicate both up and down the ladder of management'
- 'Course helped me to see that some of my own methods of communicating are sadly lacking'

- 'Very good input on what was wrong, why, what we could do about it and knowledge of sources of communication'
- 'Emphasized the pitfalls which in future I shall be aware of.'
- 'The circulated documents were and will be continually useful.'
- 'Rather boring [using information sessions] as facts and figures inevitably are, it did prove the point; it is part of management duties to accept and pass on information and where to look for further information if required.'
- 'It highlighted the need to filter and sift both useful and urgent types of information and use them promptly and efficiently.'
- 'I felt considerable new knowledge was shown to be readily available and I considered this part of the course highlighted a problem area throughout the organization'.
- 'In theory yes [i.e. successful], in practice more difficult unless there is a more disciplined approach within the department and by individuals.'
- Eight respondents referred to new sources of information being revealed.

A further phase of course evaluation, involving structured interviews with 25 per cent of the course participants, is now being planned. All of the course participants have also asked for a further review session later this year and the second course participants asked for an assessment of progress made in the areas identified above in a year's time.

Why the courses worked

Previous Project INISS work indicated that social services staff do not usually identify 'information-seeking' or 'information use' as a distinct activity, nor do they lay emphasis upon the distinctions among forms of presentation so beloved of some information staff. Instead they hold a *unitary concept of information* as anything that bears upon a problem, whatever its origins.⁴ The two Devon courses fitted in to this overall conception in that, although emphasis was placed upon externally published sources of information in the latter part of each course, this emphasis was presented in the context of communication of information through the department, which was in turn encompassed within a framework of management skills. Information-seeking was presented (and apparently seen) as one significant step in the whole process, rather than as a distinct skill. It was probably significant that libraries were not mentioned until module 5 of each course¹

The group information-seeking activities were deliberately designed to incorporate information-seeking into the *wider area of decision-making* about what and how much information was needed and where the appropriate balance lay between external and internal sources. The exercises helped to illustrate a range of problems, such as the fallible memories of experts, or distinguishing among the relative merits of national specialist organizations. The general discussion sessions afterwards brought out a number of significant issues, not least of which was that the groups which worked together *as* groups had less difficulty in coping with 'information overload' than did two less cohesive groups. The situation was well illustrated by a 'disorganized' (their term) group on the first course which complained about having too much information and not being able to assimilate it. On the second course the group faced with the

same problem and potentially the same amount of information had no obvious difficulty in completing their task. The amount of 'task focus' imparted by the chairmen to their arbitrarily selected groups had a clear effect on group cohesion. Lack of direction reportedly led to one group stockpiling information on child abuse in an obsessive manner when what they were asked to do was to look at local and comparable procedures for dealing with suspected child abuse cases. Again the other group attempting this task experienced relatively little difficulty.

Full notice was taken of the *lack of information sources* available to or used by social services staff. Emphasis was placed upon introducing participants to a limited range of reference books and other information tools of a kind which could be introduced more widely into their department. Similarly, in discussing local organization of resources, emphasis was placed upon simple systems and systematic procedures rather than elaborate classification schemes and comprehensive approaches which were unlikely to be developed without outside help. Significantly, the elements which were most eagerly grasped in discussion of this latter presentation were the ideas of adopting mutually exclusive categories for filing systems, of marking files for destruction or review when they are created, and of systematic review programmes for office information files. In retrospect the authors feel that more time could have been devoted to this element of the course, because it was seen as immediately relevant and because it is an area of work which participants could immediately take steps to improve, upon completion of their course. (Indeed, some participants are reported to have 'tackled their filing systems' when they returned to work.)

The fact that participants were only introduced to a limited range of information sources had a visible effect upon their *confidence in handling the materials*. Users were not formally instructed in the use of these materials except during a brief outline of different types of information and sources. The only teaching aids used were a series of posters giving 'typical' problems (based on Project INISS findings) listing potential sources of published information and supported by a handout describing the source materials on display. Participants found out for themselves how different sources worked and decided for themselves which sources they wished to learn to use, with assistance from course tutors when appropriate. However, the activities did not involve aimless browsing, since they were linked to the individual's own information needs or to a group activity.

The *individual information search* (carried out on the second course only) was considerably helped by a number of factors. Previous Project INISS work made the organizers confident that only a limited range of published materials would be required to meet the majority of information needs. A high level of co-operation was obtained from the County Libraries Department, and from the Library at the College of St Mark and St John, where the courses were held. Two of the course organizers had previous experience of librarianship and information work and a third had considerable personal knowledge of the work interests and general capacities of the course participants. The participants themselves proved surprisingly adroit in specifying subject areas of interest, most of which lent themselves to a systematic information search. Again Project INISS work had suggested, and this experience confirmed, that only limited amounts of information were required on any given topic; and the fact that a firm offer could be made to supply participants with publications felt to be potentially useful as a result of the search, helped transform a training exercise into

something more practical. Some of the subjects which were identified by participants were

Alternatives to residential care for the elderly

*Battered wives

Boarding-out schemes for mentally handicapped children

The use of close circuit TV in assessing behavioural disturbance in children

Management by objectives (in a social services context)

Interviewing for staff selection

*Groupwork in adoption and fostering

Confusion of the elderly

*Developments in training for mentally handicapped adults.

*These three topics were selected for additional computer-searches (carried out at Sheffield University) The results caused considerable interest on the course and a request for a further computer-search.

Although social services staff have few information resources immediately at their disposal, some *other facilities* are potentially available to them. Discussion following the brief presentations about existing facilities in Devon revealed considerable ignorance of such matters as use of library facilities, including borrowing, reference, inter-library loan, non-book stocks, the electoral register and the use of academic libraries. The more specialized county-level services provided by the Local Government Library, Statistics and Social Services Research sections were introduced by spokesmen and discussion showed unexpected gaps in the participants' knowledge of these services.

One other apparent reason for success was the *relative detachment* of the course presenters. Neither the headquarters-based Assistant Director who presented modules 1 and 2, nor the Principal Investigator of Project INISS who took over from him, were concerned with the day-to-day politics of West Devon. This facilitated discussion of such issues as delegation and the roles within the department of residential homes staff.

Results and implications of the courses

As a climax to each course, participants were asked to recommend changes to existing practices and necessary innovations. Their suggestions were wide-ranging but included:

- employment of an area information officer;
- production of an area staff bulletin;
- compilation of a central client register for the area,
- proposals aimed at developing more effective area management team meetings including more effective minute-taking and distribution,
- standardization and development of local information and record-keeping systems;
- further training in information skills aimed at other levels of department staff.

The ideas themselves are not revolutionary although they go some way beyond the level of service provision normally encountered at area level in a social services department. It should, however, be emphasized that the approach which brought about acceptance of these ideas was not prescriptive. The consensus in favour of these

ideas which was obtained by the participants themselves should give impetus to their implementation by the Area Management Team, particularly in view of the fact that most members of the AMT attended one of the courses. Whether this evident desire for change in West Devon will be translated into reality remains to be seen. One problem for consideration by other potential course organizers is the extent to which courses of this type are appropriate elsewhere. It should be noted that West Devon has moved through a period of considerable change since local government reorganization and the state of managerial development across the area was probably ideal for such a course. Emphasis could be said to have changed from recruiting the right people to ensuring that they have the resources to perform well; and informal discussions suggested that had the course been mounted two years earlier it would have had less impact.

Another factor to be considered is that, from its inception, Project INISS was involved with West Devon and the idea of longer-term involvement was always inherent when particular pieces of work were undertaken. An 'expectation of change' may have been subtly induced in the area by the fact that the Area Management Team countenanced the initial research presence and later by the direct training involvement of Project INISS. Clearly the involvement of a research project in any department has some effect on that department. It has been suggested elsewhere^b that the presence of 'information researchers' in a department may provide a good excuse for abandoning the effort after the researchers have withdrawn (*'We could only do it because of their resources'*) and other departments might be tempted to avoid adopting any innovations resulting from such a project for the same reason.

Project INISS staff realized from the outset that the training courses would only be effective if elements in them could readily be adapted for use by training staff and others in other social services departments. The Devon courses were aimed at middle management; preparations are now being made for a shorter course aimed at social workers and administrative support staff in North Yorkshire. Guidelines for running these types of course may then be prepared by Project INISS and suitable posters and other teaching materials may be made available by the TWE.

Conclusion

It is our belief that courses to train practising social workers to make more effective use of information *can* be developed, provided that information is seen in the context of the whole communication system which constitutes any social services department, and that the social worker's view of information is recognized as being quite different from the librarian's.

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▲ The library, teletext and the 1979 general election

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On 4 May 1979 Margaret Thatcher became Prime Minister. For the first time general election results were disseminated by teletext. On the same day the use of a teletext receiver was observed in Belfast Public Library. This article indicates the behaviour of user groups, the range of information obtained and the problems users encountered, and ends with a brief analysis of the election day news broadcast by Ceefax and Oracle respectively. The need for further research in this area by librarians and information scientists is stressed.

THURSDAY 3 MAY 1979 was the day that the citizens of the United Kingdom went to the polls to elect a government. Counting of the ballot papers began late on Thursday evening and the first results started to appear in the early hours of Friday morning. By breakfast-time it was fairly clear that the government of James Callaghan was heading for defeat and within hours Britain would have a new Conservative government and its first woman prime minister, Margaret Thatcher. The newspapers, radio and television covered this major news story and for the first time British general election news was disseminated by a new information system, namely teletext.

On Friday 4 May 1979 the use of teletext and the nature of the information transmitted was observed in the Business, Science and Technology Library, Belfast Public Library from 9.00 a.m.–5.00 p.m. The aim of the observation was fourfold: firstly to observe how users reacted to this new information system, secondly to determine the range of information accessed via teletext, thirdly to observe any problems encountered by users or with the system itself, and finally to analyse the election day news headlines broadcast on teletext.

The Business, Science and Technology library houses one of the most important collections in Northern Ireland. It is used widely by people in Belfast but it also has an important role to play in providing less well-endowed libraries in the Province with information. In October 1978 BST was the first library in Northern Ireland to install a teletext receiver. It is located at a corner of the issue-desk. The key-pad for accessing frames of teletext information can be used easily by library staff and users alike.

▲ The users

Obviously not all those who entered the library used or showed any interest in teletext but, as will be shown later, the system does tend to have a magnetic effect in drawing library users to it—a reflection of its newness, the public's lack of knowledge of the system and general curiosity.

A number of distinct groups of user behaviour were encountered. Firstly there were those who entered the library and headed straight for the teletext receiver. In fact the first member of the public to use the system fell into this category. During the lunch period (12 noon–2.00 p.m.) most users in this category emerged. They appeared to be mostly business men. One interesting aspect of this group was that on several occasions, when people who entered the library, and made it quite clear by their movements that they were going directly to the teletext receiver, found that someone else was using the system, they almost immediately left the library without using any other of its resources. It was also observed that the quest for information and/or the fascination of the system led these people to return a few minutes later to attempt, once again, to gain access to teletext.

The second group to emerge also headed straight for the teletext receiver but instead of using the system independently, as with the previous group, relied heavily on the library staff to help them gain the information. This group tended to be mostly young people and most users appeared to be familiarizing themselves with the system. Why they were interested only in teletext yet at the same time were unable or unsure how to use it was difficult to determine. Perhaps they had seen it in the library before or heard about it from someone else.

The third type of behaviour encountered was by those who were already in the library using other material or making enquiries and later on used teletext. One student who had watched others use the system left his books and spent a considerable time finding his way through Ceefax and Oracle. A young man who initially came to ask the library staff to obtain some magazine back copies for him accessed teletext while the librarian was away searching for the material. One elderly lady, after spending a considerable amount of time poring through the latest edition of the *Financial Times*, followed it up by accessing the financial information on teletext.

Another group of library users were indirectly involved with the system. They looked at the information but did not actually change any of the frames themselves. Some of these people stopped and observed others changing the frames as they walked through the library; others noticed the information as they were waiting for assistance at the issue desk. Several people even jotted down pieces of information that they had not initially obtained themselves. One man looked at the information while a member of staff made a telephone call on his behalf.

Last, but by no means least, the library staff were users of the system. The first telephone enquiry of the day at 9.10 a.m. was dealt with quickly by finding the value of the Swiss franc on teletext and on a number of occasions librarians accessed other financial information on behalf of library users. As the day progressed it also became very clear that all the library staff had an important, informal user education role. On many occasions librarians helped users to gain access to the system and/or explained how it worked and described the range of information that could be obtained. Apart from familiarizing users with a new library resource, the librarians were also indirectly helping the diffusion process of this new information technology through society as a whole. It was interesting to note that although in the recent past both BBC and IBA had launched publicity drives for Ceefax and Oracle respectively there were still plenty of people who had very little or no knowledge of the systems.

One interesting aspect of user behaviour was the way in which teletext, a new information carrier and a new information source, was becoming integrated with the

full range of information carriers and sources such as telephones, books, newspapers and people themselves. Although the majority of people accessed teletext solely it was clear that as the diffusion process continues and teletext becomes fully accepted it will be used in conjunction with other media not only in libraries but in homes and places of work.

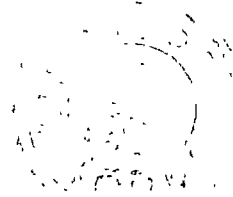
Few teletext users accessed one specific piece or area of information and then went away. Most people found teletext so intriguing that they moved backwards and forwards in one system and regularly switched between Ceefax and Oracle. Even those who were interested in a certain piece of information continued to access other frames of information. Most people were still familiarizing themselves with teletext. In fact it could be said that most users were browsing and a lot of the information was gained by serendipity. One important influence which gave users a great deal of freedom to explore teletext was the simple fact that it was free. Providing a user was not preventing others from using teletext he could spend as long as he wished accessing as much information as he wanted. If the user had had to pay for each frame of information patterns of use might have been very different.

Teletext attracted users of all ages. As mentioned already the majority of users accessed a number of different frames of information. Some users spent only a few minutes; a few users were engrossed for more than thirty minutes. Obviously the number of people in the library at a particular time influenced the time any individual used the system. One aspect of this new means of transmitting information is that users reveal their information requirements to the rest of the library. In a sense it could be said that teletext breaks the privacy of the user. Any user can walk into a library and refer to books without informing anyone about the nature of the information he is seeking but when teletext is accessed the information is available for all to see and, as has been pointed out, non-users of teletext tend to be attracted to it. At present the range of information on teletext—news, sporting, financial and entertainment—is so general that the need for privacy for the individual is not a cause for concern. In future years, however, when the range of information is wider and interactive systems such as Prestel are widely available the need for privacy may have to be taken into greater consideration.

The range of information

Although there are differences between Ceefax and Oracle they both deal with the same sorts of information. On 4 May 1979 both systems paid a great deal of attention to the dissemination of election results and news. Oracle produced a printed guide to all the constituencies in the United Kingdom which gave a frame number indicating where information about each constituency could be obtained. When Oracle was accessed for information about a specific constituency the frame of information either informed the user of the votes cast for each candidate or gave the estimated time for the declaration of the result. Similar information was provided by Ceefax 2 on BBC2. Other election day facilities on teletext included up-to-date information about key marginal seats and the latest result flash.

An attempt was made to record the nature of each frame of information accessed. At times this proved to be rather difficult as users changed frames rapidly and often returned to frames accessed only a few minutes before. Nevertheless, it was possible



to breakdown the information accessed, on the day in question, into five categories reflecting broad trends, as follows:

- 38 per cent election information
- 28 per cent financial information
- 20 per cent news and weather
- 8 per cent sport
- 6 per cent miscellaneous

Although election information was the largest category it was not as big as one would have expected. Several factors help explain this. Most people were well aware of the overall result pattern through the morning newspapers, radio and television. People in Belfast were primarily interested in the results from Northern Ireland's twelve constituencies, but it was not until the afternoon that most of these results were available and it was then that the bulk of the election information was accessed.

The financial information was the second largest category and it was clear that this is regarded as a very important development by users and librarians. Reference has already been made to its use. It was in this area that the most specific information searches were observed, rather than users appearing to move aimlessly through the system.

The remaining three categories—news and weather, sport and miscellaneous—were accessed primarily by those who were familiarizing themselves with teletext. The miscellaneous information obtained ranged from the 'Top 30' to best buys in fruit!

Apart from those who came into the library to gain a specific piece of financial or electoral information it was difficult to determine to what extent users were genuinely interested in the information they obtained. Even those who headed straight for teletext often 'played' with the system. Undoubtedly the process of familiarization was taking place for most users. They were browsing in the same way that one browses through a newly published newspaper or magazine. Only by using teletext in this way will users become aware of its potential as an information source.

The problems encountered

It was interesting to observe some users who were obviously unfamiliar with teletext resolve their difficulties by simple trial-and-error learning. Often users did not bother to read instructions but merely 'played' with the key-pad until they obtained the desired result. A number of users, for example, lost teletext and gained the colour television picture or superimposed teletext over the picture. A few users who had such problems did not ask the library staff for help even when there was no one else at the issue desk occupying the attention of librarians.

Apart from these difficulties which resulted from the users' unfamiliarity with teletext several problems emerged during the day that were faults in the system itself. These are important to consider since they could jeopardize users' faith in teletext.

Two categories of fault were encountered, firstly faults acknowledged by the broadcasting authorities, and secondly those unacknowledged. In the first category there was a temporary loss of Ceefax at 9.40 a.m. An apology notice gave this information when it was attempted to obtain Ceefax. It was interesting to note that Oracle mentioned this temporary loss of its 'rival'. However at 10.10 a.m. when Oracle

was accessed information was not available; a frame of information announced 'we regret this temporary interruption, normal service will be resumed shortly'. In both instances the systems were unobtainable for only a few minutes.

Faults of the second category were very frustrating for librarians and users. The fact that an apology notice did not appear indicated that they were of the 'circumstances beyond our control' breed. At 12.54 p.m. and 1.00 p.m., for example, it was impossible to gain access to Oracle and at 3.50 p.m. Oracle was 'down' again having returned about 1.30 p.m. Even when Oracle returned at lunchtime users encountered difficulties with it during the afternoon. When individuals access a particular frame they can watch a digital counter at the top of the television screen change until the correct frame of information is obtained. On a number of occasions strange things happened. At 2.10 p.m., for example, one user was trying to access Frame 503 on the special Oracle election results service. When the digital counter reached 475 it suddenly jumped to 220. It was also noticed that even getting to 475 was slow and the page number digit appeared to stop at irregular intervals. In addition the digital clock, which is in a similar position to the page counter, stopped. Despite these problems on Oracle it was still possible to obtain information on Ceefax during the same time period. These faults in the system were annoying as the librarians, who had no control over them, were invariably asked to help some users when difficulties were encountered. Teletext systems are still at an early stage in their development. If they are to be regarded as technically reliable sources of information it is obvious that problems similar to those encountered on 4 May will have to be ironed out.

The election day news on teletext

As a new tool for the dissemination of information teletext systems are worthy of investigation by librarians and information scientists. It seemed that the way in which Ceefax and Oracle dealt with an important and, as it turned out, historical event in British history might reveal some interesting comparisons between the two systems and would pose questions for further study. In view of the time involved and the availability of only one teletext receiver it was decided to analyse the news headlines broadcast by Ceefax and Oracle. Each system was accessed five times during the day—Ceefax first and Oracle within five minutes in an attempt to record what the news headlines revealed in parallel. It was impossible to record the headlines at equal time periods due to the fact that other people were using teletext but it was possible to make the intervals roughly one hour each. (It was not possible to record the headlines during the lunch period.) Times of access were:

Ceefax	11.10	12.15	14.06*	15.00	16.17
Oracle	11.15	12.20	14.03	15.03	16.22

*By mistake Oracle was interrogated before Ceefax.

Each time the headlines were obtained they were written down in full. This in itself is an interesting record since teletext (at present) cannot be traced retrospectively. Below are given the Ceefax 1 headlines at 11.10 a.m. on Friday 4 May 1979 followed by the Oracle headlines at 11.15 a.m. The number at the end of each piece of information refers to the frame where the story behind the headline could be found.

Ceefax 1 (11 10 a.m.)

It looks like Mrs Thatcher for No.10 as Tories head for 35 seat majority	102
State of parties	103
Jeremy Thorpe beaten in North Devon	105
Labour personalities defeated	104
Nationalists fare badly	106
Pound strengthens	129
Other news	
Heroin worth £2m seized in Essex	110
Three policemen killed by S.African nationalist guerillas in Soweto	112
Election results 210-292 BBC2	

Oracle (11.15 a.m.)

Thatcher hopes for midday victory	210
Callaghan expected to see Queen	215
ITN forecasts Tory majority of 39	204
Thorpe suffers shattering defeat	214
Scottish nationalist vote collapses	212
Plaid Cymru leader loses seat	208
Foreign Secretary scrapes home	213
Latest result	205
Gains: Conservative	206
Labour	207
Ian Smith welcomes Tory gains	219

In general both systems were broadcasting roughly the same stories but as close observation reveals there were differences in factual information, the presentation of information and topics covered. Throughout the day the election news changed quite rapidly and the headlines were updated by Ceefax and Oracle journalists accordingly. By combining the two sets of headlines it was possible to record the news as broadcast by teletext services in the United Kingdom. The column below shows the headlines and the way the day developed. Where one teletext system is named in parentheses after another it indicates the time that a similar headline appeared.

Election day news unfolds on teletext

It looks like Mrs Thatcher for No. 10 as Tories head for 35 seat majority	Ceefax 11.10 (Oracle 11.15)
Jeremy Thorpe beaten in North Devon	Ceefax 11.10 (Oracle 11.15)
Labour personalities defeated	Ceefax 11.10
Nationalists fare badly	Ceefax 11.10 (Oracle 11.15)
Pound strengthens	Ceefax 11.10
Heroin worth £2m. seized in Essex	Ceefax 11.10
Three policemen killed by S.African nationalist guerillas in Soweto	Ceefax 11.10

Foreign Secretary scrapes home	Oracle 11.15
Ian Smith welcomes Tory gains	Oracle 11.15
Union leaders disappointed	Ceefax 12.15 (Oracle 12.20)
Election surprise for Americans	Ceefax 12.15
Six charged in connection with heroin seized by customs in Harwich	Ceefax 12.15
Local elections. early Labour success in Coventry	Ceefax 12.15 (Oracle 14.03)
Callaghan to see Queen at 1.00 p.m.	Oracle 12.20 (Ceefax 14.06)
Thorpe, Pardoe, Hooson defeated	Oracle 14.04 (Ceefax 14.06)
Thatcher clinches victory as Mrs Williams slumps to shock defeat	Oracle 15.03 (Ceefax 16.17)
Thatcher to name Cabinet tomorrow	Oracle 15.03
Pound eases after early gains	Ceefax 16.17
Callaghan wishes Thatcher success but regrets Shir- ley Williams defeat	Oracle 16.22
ITN forecasts majority of 43	Oracle 16.22
Paisley's party wins two more seats	Oracle 16.22

It should be borne in mind that the news headlines delineated above appeared when one user accessed the systems. The times given do not refer to the time that a specific headline first appeared on teletext. It is interesting to note that if the first seven headlines, representing the first frame of information obtained on Ceefax, are excluded, it would appear that on the day in question Oracle was giving more up-to-date information than Ceefax. A good example of this concerned the defeat of Shirley Williams, on oracle at 15.03 and Ceefax at 16.17

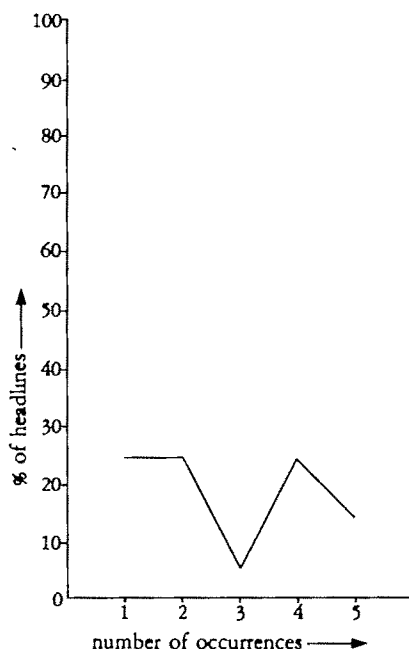
Obviously this particular example does not mean that there was a 74 minute time-lag in Ceefax inputting this information. It does indicate that teletext users are wise to access both systems if obtaining the most up-to-date information is regarded as important. The fact that the news items are not exactly the same tends to overturn the argument that Ceefax and Oracle are merely duplicating each other. In addition more than one interpretation of 'reality' by this new information technology is a healthy sign for democracy.

When all the headlines recorded during the observation period were analyzed it was noticeable that some appeared more than once indicating that perhaps the news was not changing as much as expected.

Figure 1 shows the pattern of news headlines on Ceefax and Oracle respectively between 11.10 a.m. and 16.22 p.m. on 4 May 1979.

Clearly two very different pictures emerge. Whereas the total number of news headlines broadcast during the observation period was roughly the same there is considerable variation in the number of different headlines. It would appear that Oracle was the most responsive system to new items of news on the day after the general election. Although this is an interesting observation further research would be

CEEFAX 1—19 different headlines
53 headlines (total)



ORACLE—26 different headlines
51 headlines (total)

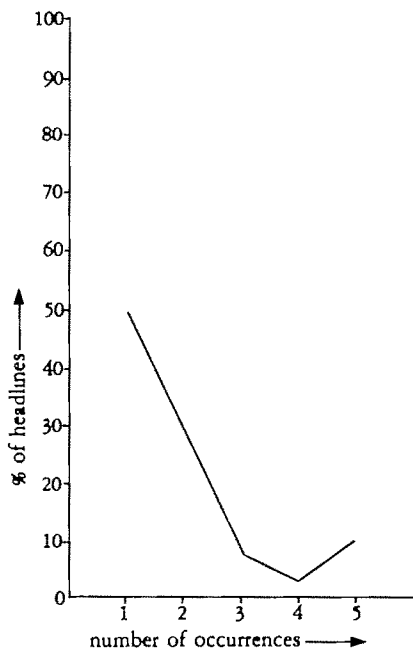


FIG 1 *Graphs showing the pattern of news headlines on teletext between 11 10 a.m. and 16 22 p.m. on 4th May 1979*

required to determine whether or not one system is actually more up-to-date than the other. It has to be remembered that in this particular case only the news headlines were analysed and not the specific frames of news. The fact that a headline remains constant does not necessarily imply that the news is the same. For example Ceefax had one headline 'State of parties' which appeared five times yet this information changed continuously throughout the day.

This brief analysis of one day's news headlines on teletext highlights the need for further investigation of this new means of disseminating information. When one surveys the entire range of teletext information it is clear that Ceefax and Oracle can be compared with conventional printed daily newspapers. It is important that this new form of broadcast journalism is the subject of research and that librarians and information scientists are actively involved in this work.

Conclusions

One day's detailed observation of teletext in a library environment cannot result in firm conclusions about this important new development. Nevertheless it is possible to make a number of general statements.

Many people are still unaware of the potential of teletext systems as sources of information.

The library can play an important role in the diffusion process of teletext through society as a whole.

The use of teletext in a library environment has implications for space utilization in view of the fact that demand for access to television information services is likely to increase in future years.

Users are gradually becoming aware of the fact that teletext can furnish specific information needs but the majority are 'browsing' through the system to become familiar with the range of information available

At present teletext is not completely reliable in technical terms

Ceefax and Oracle are not duplicating each other and the fact that two complementary systems exist safeguards the public's interest.

Demand and supply of information: two studies

Alison Jago

Institute of Personnel Management (IPM), London

A brief description of the main activities of the Information Service at the Institute of Personnel Management (IPM) is followed by a detailed explanation of two successful experimental studies of the service which were recently carried out. Study One measures the level of demand from enquirers by analysing all subject enquiries received over a three month period. The enquiries were classified into forty-six main subjects. Study Two investigates the adequacy of both published and unpublished material held by the IPM Library for the same forty-six subjects. The purpose, method and conclusion is given for each study, and it is shown how the findings of the two studies were linked. Short extracts from the studies are included. A summary stresses that any information service must maintain a constant awareness of the changing needs of its users, so that their needs are not only met but anticipated. Studies such as these will provide an effective basis for achieving this aim.

IPM Information Service

ACCESS TO RELEVANT and up-to-date information is vital for today's personnel manager to effectively tackle the many problems arising in the work place. The Information Service at IPM is designed to meet this need. Between 600 and 700 enquiries are handled each month by a small team of qualified information specialists and trained subject specialists. The activities of the Information Service can be divided into three main areas

Information: A comprehensive library of over 16,000 books, more than 100 periodical titles, and an extensive range of company material forms the basis of the Information Service. Requests for information are received from IPM members throughout the UK and abroad.

Advice: Currently about 20 per cent of all enquiries are for advice and this valuable aspect of the service is steadily growing in importance. Professional advice is provided on specific employment problems usually relating to employment law.

Research The Information Department carries out research into company personnel management practice and the results are published as the IPM Information Report series. Recent titles have included subjects such as Sick Pay Schemes, Disciplinary Procedures and Practice, and Executive Redundancy. Subjects selected for research are primarily those with a high demand from enquirers using the Information Service and where availability of suitable material for loan is low. In order to identify these subjects in a more systematic and effective way, the Information Department recently carried out two experimental studies

- Study One measured the level of demand from enquirers by analysing all subject enquiries received by the Information Service for a period of three months. The enquiries were classified into forty-six main subjects. Study Two investigated the adequacy of coverage of both published and unpublished material held by the IPM Library for the same forty-six subjects. The findings of the two studies were linked so that those subjects with high demand but low coverage could be isolated. The results of Study One were incorporated in abbreviated form into the tables of Study Two enabling a direct comparison of the two studies to be made. (A sample table is given later.)

Study one: demand for information

Purpose

The purpose of the analysis was:

- to show where the main areas of interest in personnel management currently lie by measuring the level of demand from enquirers;
- to interpret the findings where possible.

Method

All requests for information and advice for a three month period were extracted from the records and set aside for analysis. Straight book loans, i.e. requests for specific books or articles, were excluded. (Many of these requests are for books new to the library and are borrowed for that reason only.)

- Over 1,000 enquiries for the three months were included in the study and were classified using subject headings based on the London Classification of Business Studies, the scheme used in the IPM Library. (Any enquiry covering two subjects was counted as two enquiries.)
- Subjects with a large number of enquiries were broken down by further sub-headings.
- Although the content of the report was mainly statistical an interpretation of the findings was made where possible and the reasons for any notable trends defined. For example, the following extract from Study One explains the reason for the high number of enquiries on employment law:

'Although always of importance employment law has recently become a subject of major concern to those involved in personnel management. In 1974, the Trade Union and Labour Relations Act marked the beginning of a dramatic increase in legislation passed which has resulted in an enormous expansion in the scope and complexity of employment law, the latter being a continuous process as case law develops. Consequently the demand for advice and information concerning legislation exceeds any other subject except Pay and Employment Conditions.'
- Copies of the study were distributed to all managerial and executive staff within IPM.
- A press release was dispatched to outside bodies.

Conclusion

The enquiries received by an Information Service are a valuable source of information

in themselves. The IPM Information Service is in the unique position of having daily contact with those engaged in personnel work at all levels throughout the UK and abroad, on all aspects of personnel management. The importance of this position must not be underestimated.

- The experiment has effectively outlined the main areas of interest in personnel management and successfully measured the demand from enquirers
- The considerable interest outside IPM has been surprising and the study has been mentioned in several journal articles.
- The analysis will be repeated at intervals on a continuing basis and future studies will monitor any significant trends in demand.

Study two: supply of information

Purpose

As a sequel to Study One it was decided to carry out a further study

- to measure the adequacy of subject coverage in the IPM Library for answering enquiries;
- to point out subjects with poor coverage which could form the basis of future IPM research and/or publications commissioned by the IPM

Method

The subject headings used in Study One were examined at a meeting of three Information Department staff members.

Each subject was analysed under two headings

- Books/articles (published material);
- Company examples (unpublished material).

Under these headings each subject was classified using the following symbols

- xxx—material held is *adequate* for answering *most* enquiries.
- xx—material held is adequate for answering *some* enquiries
- x—material held is inadequate for answering *most* enquiries

In order to isolate those subjects with low coverage of both published and unpublished material but with a high demand from enquiries the following abbreviations showing the findings of Study One were incorporated in the tables of Study Two

- LD (light demand)—fewer than ten enquiries reported in Study One
- MD (medium demand)—ten to thirty enquiries reported in Study One
- HD (heavy demand)—more than thirty enquiries received in Study One.

Table 1 gives an example of the layout of Study Two and shows how the findings of both studies were linked. (As the findings of the report are confidential the figures given here do not bear any resemblance to those in the original. A dash means 'not applicable'.)

TABLE 1 *Linking of Study One and Study Two*

Subject	Books/Articles	Company examples	Level of demand
Psychological testing	xx	—	LD
Recruitment—general	x	xxx	LD
—advertising	xx	—	HD
—application forms	xxx	xx	HD
—assessment centres	xx	—	HD
—costs	x	xxx	HD
—employee introduction schemes	xxx	xxx	HD
—graduates	x	x	HD
—overseas	x	xxx	HD
—references	xxx	xxx	HD
Redundancy (non-legal)	xx	xxx	LD
Relocation and expenses	xxx	xxx	LD
Remuneration and incentives	xx	x	MD
Retirement	x	xxx	LD

Conclusion

Study Two showed that 55 per cent of subjects were found to be inadequately covered by either published or unpublished material. The IPM Library aims at purchasing all UK publications (books and periodicals) relevant to personnel management in the UK and abroad, plus a selection of notable US publications. Therefore any gap in the published material held by the Library is no reflection on the acquisitions policy but means that there is little or no published material available for purchase.

—The subjects with highest demand and poorest coverage were singled out for special attention.

—The most effective and immediate method of improving coverage in the IPM Library would be by the systematic and continuous addition of company examples.

—Future research carried out by IPM or publications commissioned by IPM could fill the gaps in the published material to some extent.

Summary

Studies One and Two show that the analysis of the demand for information linked with an investigation of the subject material available is a useful method of defining suitable subjects for research, it can be of help to other functions in the organization, and it can be of positive assistance in planning the current and future development of the Information Service.

It is essential that any Information Service maintain a constant awareness of the changing needs of its users, so that their needs are not only met, but where possible anticipated. These studies carried out at intervals will provide an effective basis for achieving this aim.

NOTE

Copies of Study One may be obtained by sending a stamped addressed A4 envelope to Alison Jago, Information Officer, IPM, Central House, Upper Woburn Place, London WC1H 0HX. Copies of Study Two are regrettably not available as the findings are strictly confidential.

- Letter to the editor

LIBRARY INFORMATION MANAGEMENT SERIES

I was delighted to see from the editorial and contents of the October issue of *Aslib Proceedings* that your editorial policy includes contributions describing systems applications and operations of library services. May I suggest however that descriptive material should not be confined exclusively to special libraries but should extend to all types of information flow within an organization. There are many signs, as reviewed by Mannix in a recent paper,¹ that we are moving towards a much greater integration of information resources and services and I feel that the relationship between information handling as traditionally undertaken by special libraries and other types of information service is of increasing interest.

C P R Dubois
Librarian/Information Officer
International Coffee Organization

REFERENCE

- 1 MANNIX, R. D. Some future aspects of industrial information work. (Paper presented at the Conference of the Institute of Information Scientists, Torquay, June 1979, to appear)

Editor's note: While recognizing the value of articles on 'how I run my library good', *Aslib Proceedings* nevertheless welcomes contributions which take a wider view of information, as Mr Dubois suggests.

SERIES EDITORS: PETER J. TAYLOR &
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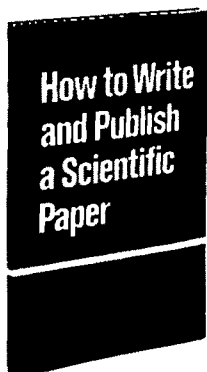
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★ Student opinion of the services of a ★ university library

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A survey of student user opinion of the new university Arts and Social Studies Library is reported. Students are concerned more about adequacy of book stocks and study spaces than about other issues. It is suggested that this type of survey might provide information for policy decision makers in allocating resources.

IN OCTOBER 1975 the new Arts and Social Studies Library was opened at University College, Cardiff. University College occupies a linear site near the centre of Cardiff and there is no clearly defined campus as such. Library development in the college has tended to follow faculty lines so that rather than a large central university library there are instead a number of specialist libraries including Applied Sciences, Sciences, Education and, now, Arts and Social Studies.

In addition to a new library building, students in the faculties served by the library (Arts, Economic and Social Studies, Theology and Law) have experienced in recent years considerable changes in library services; for example, the issue system has been automated and library instruction programmes have been extended. The time was therefore ripe for attempting to measure the reactions of students to these changes and indeed their opinions on the library and its facilities in general. It was hoped that a survey would not only inform library staff of the views of students on a wide variety of services, but also provide a stimulus to improving those services. Attitude surveys are no novelty in university libraries—the well-known Southampton surveys were carried out more than fifteen years ago^{1,2}—but they remain an important and potentially useful way of communicating with and ultimately helping those for whom the library and its systems exist.

Jones³ identified seven criteria for the evaluation of *public* library services and the purpose of this study was to answer specific questions within Jones' criteria. The specific questions were:

- (a) Were the book stocks (the primary resource of the library) adequate in the major subject areas?
- (b) Were the associated services (loan period, short loan facilities, library information, photocopyers, etc.) meeting the needs of the users?

- (c) Was the library as a place of study meeting the needs and demands placed upon it?
- (d) Was the library functioning more efficiently for some groups of users than others?

Methodology

In order to try to answer these questions, two surveys were conducted using structured questionnaires. The questionnaire form of survey was chosen mainly because it seemed the most economical method, involving little staff time and effort in its administration. The Centre for Educational Technology bore all the administrative costs of the survey (typing, distribution, computer analysis) and also gave advice on such matters as the structuring and phrasing of questions. The initial pilot study was conducted by handing questionnaires to student classes in three large, representative departments, namely English, Economics and Law. The questions asked in the pilot study covered the areas outlined above and were suggested by the assistant librarians working in the new library building. Some of the questions were influenced by conversations that the library staff had had with students and by verbal comments made by students concerning issues like study space and opening hours. In addition to the pre-coded questions several open-ended questions were used so that student opinion was not unduly restricted or directed. Where the responses from the pilot survey were clear cut, no further study was made but in general the results from the pilot study were used to design a more structured and (we hoped) more searching questionnaire which was ultimately made available for about two weeks towards the end of the spring term in 1979. The response rate to the pilot questionnaire had been disappointing (under 50 per cent) and almost all those who replied used the library regularly. It was decided, therefore, to make its successor freely available to all library users, clearly a different survey method was necessary to investigate the attitudes of irregular users and non-users. Questionnaires were collected from inside the main entrance door and returned to boxes provided for the purpose at the exit. In the event, 475 of these questionnaires were returned representing approximately one-fifth of the total number of students in the four faculties served by the Library. These were analysed using an SPSS computer analysis⁴ carried out by the South Western Universities Regional Computing Centre.

It is not intended to give a comprehensive list of the results in this paper since many of the details may not be of interest outside of the library being studied. However, the significant results are presented and discussed as an example of how useful this type of survey might be in making decisions over the use of library resources.

Results and comments

(a) *The book stocks of the library*

The single most important problem identified by the students was the lack of sufficient stocks of books. Over half of all the students completing the survey commented in one way or another on this, and so supported Roberts' findings about a college of

education library⁵ However, the issues were rather more complex than the simple one of needing to increase the number of books. It is evident that most students were happy that the books recommended in their courses are in the catalogue, but for a variety of reasons these books may not be on the shelves. The following have emerged as possible reasons for non-availability:

- Too few copies of recommended books are available to support the demands of large classes, especially large first-year classes
- A loan period of three weeks can, in itself, be a major contributory factor to a book being unavailable. Several students, particularly final-year students, advocated shorter standard loan periods, thus making the books available to more students over a fixed period of time. The facility whereby staff can borrow books for much longer periods than can students was also criticized, particularly as only one-third of students using the book recall facility actually received particular books in time to meet their needs. Not enough use is made of short loan collections as advocated by Peacock.⁶
- The library makes use of a short loan collection but its effectiveness depends on teaching staff communicating the titles of books on recommended reading lists to the library staff and to their students. In practice the use of this collection varies dramatically between departments; for example, 65 per cent of Industrial Relations students use the short loan collection frequently compared with only 14 per cent of French students. On average only about one-quarter of the students use this collection frequently and, in our survey, a significant minority of students were not referred to this collection at all.

The comments on book stocks have also been analysed on a departmental basis and this is providing a great deal of useful information about relative needs in the provision of book stocks. For example, in the departments of Archaeology, Industrial Relations, Psychology and Social Administration, less than 20 per cent of the students felt that the book stocks were adequate. Information obtained in this way can be used to supplement information gained on the relative use of the short loan collection, etc to suggest areas where financial resources are most urgently needed.

One further piece of information obtained was of great interest and was clear cut. Many of the teaching departments have their own small libraries which are stocked mainly from library resources. When students were asked about the utility of these libraries only 14 per cent of the comments were favourable, 35 per cent were unfavourable, and the rest were noncommittal. The unfavourable comments usually related to the restricted access which students had to these resources since the departmental libraries have no librarian and are often open for very limited time periods only. The overall impression gained was that the student body as a whole would favour the centralization of library resources. In many ways this supports Jones⁷ first criterion for a library service, namely, that the service should be sited appropriately.

(b) The library as a study area

It is apparent that the library is regarded not only as a source of reading material but also as a place for quiet serious study. This prompted the inclusion of a number of

questions relating to study space and study environment, the major findings were as follows

- Almost 60 per cent of student users would like the library to remain open on a Saturday afternoon (at present it closes at lunch-time on that day) and about one-third of the students asked for Sunday opening. This represents the first local attempt to quantify the perennial demand for longer opening hours. However, the issue is still not simple; what we now need to know is how often such facilities would be used and whether they are seen as priority for library financial expenditure above books. The Cambridge Library Management (CLM) group suggested in a survey of nine universities that students used libraries more on Sunday than on Saturday.
- Almost one-quarter of the students wanted more desk spaces available in the library. At present the library has a large number of desks and other work areas but also a number of easy chairs. The latter are regarded as almost useless by the students, who obviously need work space. This confirms the CLM findings on preferred type of seating. The problem in this particular library is made worse because it is a pleasant modern building. The survey revealed that a significant minority of students from other disciplines (and other colleges) use the work space facilities, presumably in preference to those in their 'home' library, thus exacerbating the problems in this particular library area.
- Two aspects of the working environment annoyed the students, one was noise identified as coming mainly from other, less considerate students, the other was the unofficial reservation of seats and work spaces by leaving books, bags and clothing in place while attending lectures or having coffee breaks. It seemed fairly clear that, on the whole, students would not object if library staff enforced the rules and regulations of the library firmly.

The question of study space did raise one major point for wider discussion. There is a general assumption that on-campus study space needs to be provided in a library context and while this clearly has many advantages, it may be that central study rooms can be provided much more cheaply per unit area than the same study area within a library. The CLM study found, for example, that 40 to 60 per cent of users of study space brought their own work materials and only one-third of them then used shelved references.

(c) Library services

Apart from services relating to book loans, there was a significant demand for an increase in the photocopier provision already available. About 15 per cent of students wanted more facilities of this type. A majority of students also wanted some formal, regular kind of library information service other than the information sheets, guides and introductory courses now given (all of which were popular and seen to be of value). The most popular suggestion was for library staff and student committees in broad subject areas. This was felt to have the advantage of giving information and allowing students to make regular comments to the library about its operation and services. Such an arrangement would fall into the unstructured, informal user survey category identified by Exon.⁸

One thing is perhaps worthy of further comment in this area. The photocopy service is very obvious, and so produced a number of requests for its improvement. Many other potential services are not available, such as replay facilities for non-book materials, computer search facilities, etc. It would be interesting to see whether other libraries experience increasing demand for 'technological support services' which they offer, in the way suggested by the demand for photocopiers in this case.

(d) The library's user groups

Our analyses enabled us to specify certain anomalies such as that described under departmental book provision. For example, the Law library appears to be well off for book stocks, but very short of study space, compared with Arts and Social Studies. It is apparent that it will be possible in the future to identify areas for comparative study using this form of survey technique.

Conclusion

A summary of the returns was made available in the library so that those who had completed questionnaires could see the result of their contributions. In addition, copies of subject analyses were sent to all members of those academic departments where the number of respondents was seen to be a significant proportion of their total number of students.

The next step was to consider how the results of the survey could be used to improve library services. Some of the specific criticisms voiced by respondents (e.g., the inadequacy of photocopying provisions and the facilities in the coffee room) have already been met. Other, less tractable problems depend for their solution on improved communication between the library and lecturing staff. This applies particularly to the effectiveness of the short loan collection, which some departments do not employ to the full or do not recommend to their students. It is hoped that the criticisms expressed by their own students may be a stimulus more powerful than other kinds of evidence (e.g., the results of a shelf-failure survey) to these departments to improve their co-operation with the library. In the case of the short loan collection it is intended that the views of students on its use should be supplemented by loan figures for the collection in specified subject areas; this is possible because records of all such loans are stored in the computer used for the automated issue system, and are easily analysed by class number.

The results of the survey can also be used by the library to help determine priorities for policy, especially at a time when resources are very limited. A striking example of this occurred a few weeks after the analysis of the returns was complete, when a proposal was put forward that the library's opening hours should be extended. In reply it could be pointed out that although students were generally in favour of extended opening, when requested in an open-ended question to list the most important improvements the library could make they felt that buying more books should receive a far higher priority than longer hours.

Finally, the survey may prove helpful in improving the library's financial provision by drawing the attention of the college to what appear to be deficiencies in book stocks. As Urquhart and Schofield comment:

Nearly every librarian is trying to get more money to run his library, and if he can

show objectively the kind of demands the library has to meet, and what happens if these demands are not met, he can make out a strong case for what he wants.⁹

There is an unfortunate tendency for the library to come to the attention of faculties and senate only when financial crises threaten large cut-backs in book or periodical budgets, the gradual erosion of its spending power arouses little interest. If the results of the survey have the effect of placing the library in the forefront of discussions on the allocation of college resources, it will have proved its worth.

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The hidden cost of saving: the effect of cancelling periodicals

P. G. Peacock

Stirling University Library

Little attention has been given to the long term effects of cancelling periodicals. A case study of Stirling University Library between 1975/76 and 1978/79 is used to demonstrate that cancelling periodicals can significantly increase a library's workload

IN RECENT YEARS many academic libraries have undertaken major exercises designed to reduce expenditure on periodicals. Descriptions of such exercises have appeared in the literature¹⁻³, but relatively little attention has been given to the long-term effects of periodical cancellations. In an important article Woodward⁴ has demonstrated that libraries seem very rarely to replace cancelled periodical subscriptions by inter-library borrowing. This paper attempts to describe how in one library a transfer of resources from periodicals to monographs increased workloads, and to draw a general conclusion.

In session 1976/77 Stirling University Library introduced an allocation formula for expenditure on library materials which set cash limits in each of twenty subject areas. Academic departments in each area were permitted to spend the money allocated to them as they wished on monographs or periodicals, provided that the limit was not exceeded. The concept of a periodicals fund was abandoned. The purpose of the change was twofold:

- to distribute library funds more equitably;
- to regulate the growth of periodical expenditure without the need for tedious annual saving exercises.

Table 1 shows the pattern of expenditure on monographs and periodicals in each of the years 1975/76 to 1978/79, together with the intake in linear metres of monographs and periodicals in each of these years. An immediate result of the changes introduced in 1976/77 was a severe reduction in real terms in expenditure on periodicals. Expenditure on periodicals rose by only 9 per cent during a period when prices were rising at an annual rate of 27 per cent⁵. Intake dropped by 4 per cent. Table 1 also provides some evidence that the new procedures continued, as intended, to restrict the growth of periodical expenditure over the next two years. As a percentage of total expenditure on monographs and periodicals, expenditure on periodicals fell from 50 per cent in 1975/76 to 37 per cent in 1978/79. This fall is probably contrary to the general trend in academic libraries. If the weights used in the University Grants

TABLE 1 *Stirling University Library. distribution of expenditure 1975/76—1978/79*

	1975/76	1976/77	1977/78	1978/79
Expenditure (£) on monographs	49,900	57,400	94,000	118,600
Expenditure (£) on periodicals	48,800	53,000	62,000	69,700
Intake (metres) of monographs	141	167	218	277
Intake (metres) of periodicals	107	102	110	121

Committee's *Index of university costs* are a reliable guide, expenditure on periodicals in the typical university library rose from 40 per cent of total expenditure in 1976 to 48 per cent in 1979.

The effect of this pattern of expenditure on the intake of monographs and periodicals is clear. In the four years to 1978/79 the annual intake of monographs expressed in linear metres of shelf space filled almost doubled, while the annual intake of periodicals increased by only 13 per cent. The increase in annual monograph intake would have been smaller had selection criteria remained the same throughout the four years. There is evidence however of a trend towards the purchase of cheaper monographs. From the figures in Table 1 it is possible to calculate for each year the cost of filling one metre of shelf space with monographs. The rise in cost/metre over the four year period was 21 per cent, much less than the increase that might have been expected had the same selection criteria been applied throughout.

The significance of these figures for the administration of the library becomes apparent if they are considered in terms of workload. The 13 per cent increase in the annual intake of periodicals caused few difficulties. The doubling of the workload of monograph acquisition and cataloguing staff presented problems of a different order. In the period under review expenditure on library staff at Stirling remained in real terms constant; had no way been found of improving the productivity of acquisition and cataloguing staff, the library would have faced a very serious backlog of work. There was happily a substantial improvement in productivity as a result of the library's participation in SCOLCAP (Scottish Libraries Co-operative Automation Project). Following the automation of cataloguing procedures in December 1977 the productivity of cataloguers increased (after some initial difficulties) by about one-third.

The measures taken at Stirling in 1976/77 represented a sharp change in direction that would perhaps be neither appropriate nor practicable in other libraries. If the measures were unusual, however, they were unusual in their severity rather than their direction. For it is very frequently the case that saving exercises are designed not only to reduce expenditure on periodicals but also to switch resources from periodicals to monographs. As has been shown above a consequence of such a switch may be a greatly increased workload for acquisition and cataloguing staff. This difficulty cannot simply be solved by the transfer of staff from the periodicals department to monograph acquisition or cataloguing, for three reasons

—Different skills are involved.

—As the studies cited above make quite clear, major saving exercises, far from reducing work, actually create it.

—It is probably generally true that staff costs per £ of expenditure on monographs are higher than staff costs per £ of expenditure on periodicals. (At Stirling in 1978/79 the administrative cost/£ of expenditure on monographs was about £0.50, on periodicals, about £0.25.) In other words more staff time is required to administer a given sum applied to the purchase of monographs than to administer the same sum applied to the purchase of periodicals.

It is possible to save substantial sums by cancelling periodicals without any appreciable reduction in the routine workload of periodicals staff, as the following hypothetical (but by no means impossible) example makes clear. It would be possible for Stirling to 'save' in the current year £3,720 by cancelling just three titles, *Science Citation Index*, *Social Sciences Citation Index* and *Arts and Humanities Citation Index*. The reduction in the workload of periodicals staff from such a saving would be too small to be measurable. If applied to the purchase of monographs, however, the £3,720 'saved' would buy some 350 to 400 typical academic titles, representing an additional workload on acquisition and cataloguing staff that would be not only measurable but a potential source of difficulty.

Under present economic conditions very few libraries have spare staff or enjoy the option of recruiting more staff. It is therefore important that when planning to switch resources from periodicals to monographs libraries should take possible long-term effects on workload fully into account.

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The two cultures: an examination of the factors inhibiting the provision of effective, library-based information services to social welfare practitioners

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This article stems from the work of the EISSWA Research Project, which has been using an action research approach to explore the information needs of social welfare practitioners. It is argued that the research carried out so far has revealed a significant area of information need on the part of this particular user group which is not being met by existing support services, and that the library-based information services in particular have either failed to appreciate that this gap exists or, being aware of it, have not taken the initiative to respond to it. A possible explanation for this is put forward, special attention being paid to the cultural context in which information work of this kind takes place, and an alternative model is proposed by which library-based information services could be adapted and developed to more effectively meet the information needs of their practitioner clients.

EXPERIMENTAL INFORMATION SERVICES in two social welfare agencies—EISSWA—is one of a number of research projects in the field of social welfare information funded in recent years by the British Library. The brief for this particular project—started in February in 1977 and due to run until February 1980—was to investigate the information needs of social workers and probation officers in Wiltshire (where the research team is based) through the establishment, monitoring and evaluation of practical systems and services designed to meet those needs, and, having done so, to draw some general conclusions which might be of value to all librarians and library-based information services working in this field.

To this end, three research workers were appointed, none of whom are librarians but who among them possess a wide range of qualifications and experience in the fields of information science, social work and research. Unrestricted access to personnel at every level in the two agencies—the Probation Service and the Social Services Department—was granted, and the full back-up resources of the Wiltshire Library and Museum Service—especially the department's information unit—were made available to the research team.

For some years prior to the establishment of the research programme, the information unit had been providing a specialist information function for Wiltshire Social Services

- Department in addition to its general service to the local authority as a whole, drawing upon a comprehensive stock of social welfare literature to provide a book loan facility, monthly abstracts of current publications, and a query-answering service. The Library and Museum Service management expected that the activities of the research team would stimulate demand for the existing services offered by the information unit as well as highlighting new areas of need. The research programme was therefore regarded as being complementary to, rather than in competition with, the information unit's existing functions

The research method

The initial stage of the research programme was taken up by a series of meetings with individuals and groups from the Social Services Department and the Probation Service. Whilst the primary purpose of these meetings was to explore aspects of staff members' information needs, they were also a crucial part of the process of establishing the credibility of the research programme in the eyes of potential participants.

The researchers for their part resisted as far as possible the temptation to predetermine the boundaries of the systems or services which might be developed, for fear of limiting the project's creative potential. By encouraging social workers and probation officers to focus upon the information content of their day-to-day tasks and problems, it became possible to identify a number of information issues which were of special concern to the users themselves and with which the research team felt able to work.

As areas of information need have been uncovered, 'contracts' have been negotiated with practitioners at individual, team, and management levels, through which the research team has agreed to establish, in collaboration with the users themselves, systems or services specifically designed to meet those needs. Practitioners have participated throughout, from the formulation of objectives and the establishment and maintenance of a system, to the monitoring and evaluation of the 'finished product'—as well as, if necessary, the redesigning of the system should it subsequently prove to be inappropriate. The research team has operated on the principle that, if users are to be motivated to make use of any system or service developed for their benefit, they must be involved at every stage in its development and, even more crucial, be allowed to have the final say in any decisions affecting the form or direction which the system takes. In short, it is the user, and not the provider, who retains the 'ownership' of the results from the joint exercise.

Areas of need

It became apparent even during the early period of the research programme that the information needs which were of most concern to the practising social worker or probation officer—and the types of system which they required to meet those needs—were very different from those with which information services have traditionally concerned themselves. Amongst the issues repeatedly raised by practitioners were:

—the anxiety created by the wealth of information received from within the agency hierarchy and from outside sources;

- the difficulty of tracing procedural information when it is needed;
- the desire to share problems, experiences and ideas with practitioners in the agency (and in other agencies) who are engaged in similar areas of work,
- the frustrations which often accompany any attempt to get hold of information on local contacts or resources at short notice,
- the lack of up-to-date reference materials (for example, *Social Services Yearbook*, *Charities Digest*) and of familiarity with the range of potentially useful sources

When it came to consideration of the kind of system or service which the practitioners themselves felt to be most suited to their information needs, the characteristics given the highest priority were

- (a) simple to use;
- (b) instantly responsive;
- (c) located within easy reach;
- (d) practice-oriented;
- (e) inspires confidence (reliability of the source being more important than reliability of the information itself),
- (f) allows for direct use without an intermediary

Any centralized information service, particularly one which has personnel located within the social welfare agency itself, would be able to satisfy some of these criteria—notably (a) and (b)—relatively easily. It might, with rather greater difficulty, be able to fulfil others, for example (c) and (d), depending upon the scope of its personnel and information resources.

Items (e) and (f), however, constitute a major challenge to any library-based information service. The extent of the user's *confidence* in the information service is likely to depend upon the strength and quality of the relationship between the information-provider and the information-receiver, notoriously difficult to sustain by telephone contact alone; whilst the practitioner's desire to have *direct access* to certain information resources demands a willingness on the part of the information specialist to relinquish control over some aspects of operations and perhaps adopt a different role in respect of others.

The project's response

Many of the research team's activities have represented an attempt to decentralize information provision to social welfare practitioners, a centralized approach being employed only where this seems to be most appropriate to the expressed needs of the user. The following is a sample of the systems and services which the team has tested on an experimental basis¹.

- Several social work teams have been helped to establish information display boards, using standard and relatively unsophisticated office equipment. The information content of the boards is decided by the team itself, whilst the purpose of the boards varies. In some cases they are a convenient and constructive means of gaining access to documents, in others a way of sharing resource information in the team and 'signposting' additional sources of information outside

- An indexed bulletin, containing current local projects of interest, has been compiled at the request of a group of community development officers and in conjunction with a range of staff throughout the Social Services Department
- One of the research team has collaborated with a main grade probation officer to produce an index to staff circulars, and this has subsequently been made available on request to a number of probation teams in the county
- Two probation teams based in the same town are being helped to assemble a guide to local office and court practice so that procedures can be standardized and new officers familiarized with these more quickly
- The researchers have acted as tutors to residential social workers on an in-service training course, helping the students to make more effective use of available information sources in various individual and group projects
- One social services area director's mail has been monitored to assess the range and quantity of information coming in to the department at management level. The results of this analysis will be used to formulate proposals for improving the current methods of disseminating information in the area

The traditional library-service response

It is worth restating the two distinguishing features which are fundamental to the EISSWA research programme. These are:

The information systems and services which have been established constitute a response to the *expressed*, rather than assumed, needs of social welfare practitioners. The involvement of the practitioner at all stages in the process helps to generate both *motivation* and *commitment* within the social welfare agency towards the solutions which are devised.

This may be contrasted with the approach generally adopted by library-based information services, which is to provide a range of resources and then to interpret the rate at which those facilities are being used as an indication of the service's success at meeting practitioners' information needs—what Smith and Webley have dubbed a 'crude index of enthusiasm'.²

A combination of factors has been responsible for this relatively narrow approach to the evaluation of service effectiveness within the library world. Day-to-day operational pressures, for instance, tend to leave little time for the application of sophisticated assessment techniques. On the other hand, a simple counting exercise is relatively easy to put into practice and, furthermore, fits the established pattern within the library field of employing issues statistics as a means of demonstrating the service's value. Ultimately, the statistical approach generally adopted has the effect of disguising what many information staff intuitively recognize—that the impact which they are able to make upon the day-to-day work of their social welfare customers may be, at best, limited. As Grayson³ has pointed out, 'The results of occasional statistical monitoring do little except indicate how well a bulletin is performing as a bulletin,' a criticism which could be applied with equal validity to many of the standard information service functions

Hence, although the concept of providing a specialist library-based information service to social welfare practitioners is relatively new and exciting, the actual facilities on offer tend to remain rooted within the mainstream of traditional library work. Wilson and Dunn⁴, in a survey carried out in 1974, identified a total of eighteen local authorities where the library service was providing a specialist information facility to the social services department. Despite local variations in practice, it was found that no service extended beyond the provision of journal bulletins (allied to a photocopying service), book loans and a general enquiry point. More recent analysis of the information resources available to social welfare practitioners offers little evidence that, for the library-based services at least, the picture has changed dramatically in the intervening period.⁵

It is not the intention of this article to suggest that journal bulletins, book loans and query services cannot perform a valuable function. On the contrary, it has been evident in the course of the project that these facilities, all of which are available to practitioners in Wiltshire via the Library and Museum Service's information unit, are much appreciated by those who are aware of them and use them. The research team has sought to capitalize on this goodwill wherever possible by publicizing the information unit's existence, improving the internal distribution of bulletins and abstracts in the two agencies concerned, and motivating practitioners to make greater use of information in their everyday work. Moreover, the research programme itself has involved a certain amount of information provision of the more traditional kind where this has been appropriate to the needs of the user, a role which would have been very difficult to fulfil without the back-up resources available from the information unit.

Nevertheless, we entirely support Smith and Webley's argument that 'ultimately the only true measures of the value of an information service will lie in changes in the operations of practitioners, just as the only true output measure for social work is changes in clients' states'.²

But this begs another question. How is an information service to measure the 'changes in the operations of practitioners' which result from its activities? Central to the EISSWA Project's approach to this problem is the conviction that any information resource which is developed must be linked directly with the practice—and therefore, by definition, the needs—of the social welfare practitioner if any valid measure of its effectiveness is to be possible. This principle is largely ignored, however, by library-based information services as they currently function. Why should this be so?

A theoretical appraisal

In order to understand this situation, we need to consider the conditions under which most information facilities of this kind operate. Few, if any, have sufficient resources to be able to offer a service to social welfare practitioners on an exclusive basis, and for most in fact this represents a small, if important, part of their overall responsibility towards the local authority as a whole. At the same time, the ever-present need to convince sceptics of the information service's value to the authority dictates the approach which is likely to be adopted, visibility of output being the prime consideration.

The consequences of these factors can be seen in the extent to which bulletins, usually consisting of press extracts or journal abstracts, quickly become the mainstay

of any embryonic information unit. The notion of concentrating upon what is collectively termed a 'current awareness' service is particularly attractive, on two counts. Firstly, it allows the information unit to provide a broadly similar service to the various professional groups within the local authority setting whilst optimizing financial outlay and staff time; it is therefore relatively efficient. Secondly, the skills and techniques involved in providing such a service—indexing, cataloguing, abstracting, and reference work—are ones at which librarians themselves, given their training and working environment, are likely to be proficient, just as the resources required to operate such a service—books, periodicals, reference material and so on—are very much the bread and butter of any library organization. Thus although the *content* of the information provided to social welfare practitioners may differ from that supplied to other local authority departments, the *format* in which it is delivered remains to all intents and purposes the same.

One clear, if unspoken, assumption underlying such a policy is that the provision of 'professional' literature helps to make the practitioner more effective. Yet what evidence is there to support such an assumption? In a study conducted by Clark and Scott⁶ in the early 1970s, 130 sociologists and psychologists completed a questionnaire designed to assess their attitude towards 'professional' literature and the importance of keeping up to date. It was found that although the practice-oriented group, when compared with those engaged in teaching or research, were lower users of their professional literature, they did not in fact perceive themselves to be any less *effective* in the performance of their professional tasks. The experience of the EISSWA Project suggests that the same may well be true of practitioners in the social work professions.

This is not meant to imply that social workers and probation officers do not have information needs, merely that the services at present being provided are aimed at needs which the practitioners themselves do not generally regard as being of the highest priority. As long as the structure within which the service is offered continues to be based predominantly upon a one-way flow of communication, with the information worker retaining ultimate control over the facility's output, the opportunities for involving practitioners in a comprehensive assessment of their information needs remain limited. At the same time, the likelihood of the practitioners themselves taking the initiative is fairly remote, since their expectations of what the library service and its staff can or cannot do will tend to be circumscribed by the resources seen to be on offer.

A new model

If library-based information services are to give greater emphasis to the needs of their social welfare customers, there will have to be a fundamental shift in attitude away from the traditional service-delivery approach, where the customer is bombarded with information in the hope that at least some of it will stick (Figure 1), towards a co-operative venture in which information workers and social welfare practitioners work together, pooling their skills and their resources to devise solutions to the information problems which really matter to the practitioners (Figure 2).

Some of the benefits of the latter approach have been experienced first-hand by those involved with the EISSWA Project. For example, a meeting of social workers and representatives of the information unit and the research project, held to air the



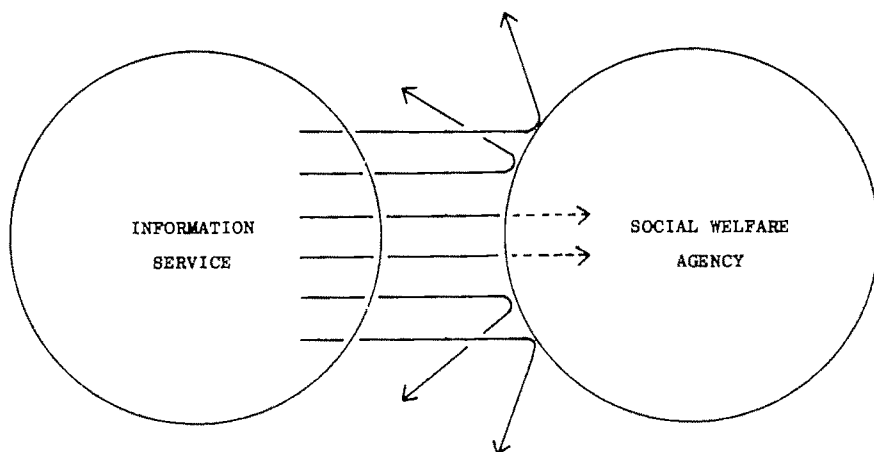
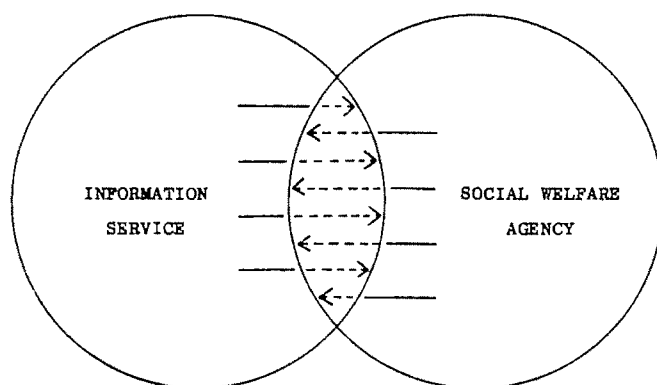


FIG 1 *Traditional service delivery approach*

practitioners' views of the abstracts and other facilities provided by the library service, revealed that many social workers were still spending a great deal of time and effort attempting to track down the addresses of hostels, voluntary organizations and the like despite their awareness that the information unit could do this for them far more efficiently. Much of the work which the researchers have undertaken with social work teams has therefore been directed towards establishing the information unit in the practitioner's repertoire of information sources, reinforcing this process by means of resource boards, handbooks, procedure manuals and so on.

Similarly, the area director referred to earlier who was concerned about his effectiveness at disseminating information in his section was prompted, by the activities of the research team, to conceptualize his dilemma as an 'information problem'. Defining the problem in this way allowed members of the research team to get involved, as 'information consultants'. From this point onwards, the crucial question for the area director was not 'is this an information problem?' but 'do these people have the necessary skills and resources to help me?'.

Finally, the approach which has been advocated can also have spin-offs for the more traditional functions of the information service. One of the research team, for instance, through his involvement with the local probation service, was able to radically improve the circulation of, and feedback from, journal abstracts by negotiating a personal copy for each probation officer. Prior to this, virtually all contact between the information unit and the probation service had been conducted through the probation headquarters staff, a practice hallowed by custom and assumed by each 'side' to have been designed for the benefit of the other! This apparently simple change in procedure has considerably increased the person-to-person contact between probation officers and information unit staff, the latter are now able to form a much clearer picture of the needs of the former.

FIG 2 *New model co-operative venture*

Strategies for involvement

Most of our comments so far have been addressed to the kind of operational philosophy which, it has been argued, library-based information services ought to adopt. Such a philosophy, however, is of little value unless it is allied to a strategy for getting and staying involved with social welfare practitioners. The EISSWA Project has experimented with a variety of strategies principally.

- individual interviews with representatives from different levels and locations within the agencies;
- attendance at team meetings, on both a one-off and a continuing basis;
- joint participation, with individual practitioners and groups of practitioners, in special projects;
- the creation of formal and informal links with research and training personnel within the social welfare agency,
- involvement in training programmes, particularly in-service ones.

None of these strategies is in any way exclusive to the field of research, and we maintain that all are appropriate for use by information workers concerned to develop the quality of their service to the social welfare world.

Whatever strategies are selected, however, the key characteristic of any involvement which takes place is that it should be *purposefully structured*. In other words, it should be clear to all the parties concerned why the information worker is participating and what his contribution is designed to achieve. Information services which pride themselves on the extent to which their staff are 'seen' within other agencies might do well to reflect on whether this presence actively contributes towards the level of involvement with practitioners—or simply acquires for the information staff the reputation of having nothing better to do with their time.

The two cultures

The model which has been developed in the course of this article is one which demands a great deal of any information service and its staff. It required that they are able first of all to clearly identify the skills and resources—material and personal—at their disposal and, equally important, to *communicate* this information to their users or potential users. Furthermore, staff need to be able to operate comfortably in a variety of different roles, from information provider to researcher to trainer to consultant, there are likely to be occasions when the information specialist's role is difficult to specify and the boundary between it and the social welfare practitioner's role is somewhat fluid.

The difficulties of operating in this grey area have been well documented by Friend *et al*. They point out that subtle differences in culture—the beliefs, assumptions, and codes of behaviour shared by individuals within the same organization or profession—can lead to illusions and misunderstandings when people from different work settings attempt to undertake a joint task, and that it is therefore crucial for these individuals to appreciate the cultural setting in which the person on the other side of the boundary works. Similarly, conflicts of loyalty may arise from the failure to reconcile organizational accountability with the need to develop informal links of trust with individuals across the boundary. Anyone functioning at this level of inter-organizational activity needs to be able to cope with a high level of anxiety and stress, and clearly requires the full support of the managements of both agencies to be successful.

Having the role of 'researcher' has enabled the members of the EISSWA team to negotiate the boundary between information work and social work with fewer difficulties than would perhaps be encountered by a library-based information service. Whilst in no way underestimating the scale of the task, the potential benefits, to both information workers and social workers, from the shift in emphasis which is proposed by this article are surely worth further examination.

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Electronic translation?

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'THE AGE OF MIRACLES is over,' they say, attributing the wonders of today's world to technology. But if the advertisement for a 'Language Translator'¹ is to be believed, we must continue to accept marvels. With this personal pocket computer it is claimed that, 'You can communicate in a foreign country without speaking the language, or you can learn the language more easily thanks to a new electronic miracle.' We are further told that the gadget translates words and phrases into and out of six languages.

The makers of 'products that think' might have impressed me more had I not been a practising translator. This does not imply scepticism but a certain wariness. An article entitled 'Adventures in translation' supporting my suspicions appeared in *Business Traveller*² a month after the above advertisement. It described the trials of the proud owner of a pocket computer which flashed the puzzling message in German 'Make you to take credit playing cards?' when enquiring if he could pay for a meal with an American Express card. 'I want menu' was a little better though hardly likely to get the best out of the waiter, but a request to mind luggage—'Look at my paper bag'—met with a blank stare. Continuing his travels, the reporter tried Italian. The machine spelled out FARE IO PRENDERE CENA?, 'Do I take supper', while in Spanish an enquiry for the price of a book came out as COMO MUCHO EL LIBRO?, 'I eat a lot the book!'. The toy generated great interest but the practical aspect of typing out phrases, letter by letter, and obtaining dubious answers, compared unfavourably with even the worst of phrase books.

If this is the state of computer translation why are multinational companies and government organizations paying huge sums for machine translation projects in the hope of obtaining practical results? The answer must lie somewhere between such a pocket data bank, wrongly called a translator, and the automatic conversion of unedited texts from one natural language to another at a cost far exceeding the employment of human beings for the same task.

In the above examples the second request rendered as ICH WOLLEN SPEISE-KARTE (I want menu) is intelligible if abrupt and we can overlook the plural verb *wollen* instead of the first person singular form. The order to 'Watch my bag' which came out as BETRACHTEN MEIN TUETE (Look at my paper bag), presented another problem as the computer contains 'watch=see' and 'watch=clock'. A more sophisticated machine translation system would know to look for a verb, but when faced with a choice, this device flashes a series of question marks asking the user to go into the search mode and he can then select the right word. Even so, the result was scarcely satisfactory.

The Spanish example contains an ambiguity in the target language. *Como* means both 'how' and 'I eat' and in this sentence we need *cuan*to (how much) not *mu*cho.

(much) In a shop, *Cuanto el libro* would suffice for most tourist requirements but to put the question in acceptable Spanish form 'How much costs the book?' either the computer or the user must know something of the language. In German the question would need to be 'What costs the book?' as 'how much' might come out as 'how very' (*wie sehr*) instead of the required *wie viel*. Reversing the process, a German inputting *wieviel* would be as likely to get 'how many' as 'how much' and, as any foreigner who has struggled to learn English can appreciate, it would take some programming to differentiate correctly between these two alternatives.

The first request, intended as 'Do you take credit cards?', appeared as MACHEN SIE NEHMEN KREDIT SPIELKARTEN? (Make you to take, etc.) because the user had not learned to ask questions without an auxiliary. In Italian we come nearer an equivalent for our 'do' with *fare*, but *prendere cena* suggests physically snatching the meal and their use of 'take' differs from ours, furthermore, the Italians would employ a verb *cenare* to eat supper.

As for Japanese, in which one can be ridiculous or even offensive by using wrong registers that involve different vocabularies for men and women, I doubt if the miracle machine will foster international relations except by creating novelty interest and drawing out conversations longer than before!

So it goes on—in other words, to use the pocket computer properly, the user needs to know the language it claims to teach before he starts. But someone who knows even only a little of the language is unlikely to find such basic information any more helpful than a pocket dictionary with its more straightforward access.

At the other end of the automatic translation spectrum we have SYSTRAN, a system operated by the US Government and Commission of the European Communities amongst others. Over half the budget of the European Parliament is swallowed up by translation costs and, given the equal validity of all member state languages, the accession of Greece, Spain and Portugal will strain the budget to a frightening degree by increasing the language pairs from thirty to seventy-two. An evaluation of the 'Systran Automatic Translation System' undertaken by Jacques Chaumier *et al* a few years ago³ indicating a future role for the system said '... that, in terms of economics, its (SYSTRAN's) performance—whilst also capable of improvement—allowed its use to be envisaged. ...'. But leaving aside these examples at the extremes of the machine translation spectrum, how can staff and freelance translators benefit from electronic equipment now on the market to enable them not to become redundant but to work more effectively?

What do we mean by 'effectively'? We will not follow the red herring by asking if translators, or anyone else in this country, could work harder, we will look into the efficiency of the job. A commercial translation is a compromise with time. Given unlimited scope for reflection, second thoughts, revision, consultation and returning to the job with a fresh eye, we could in theory, produce the perfect translation. In fact, if you take faithful representation of the original in another language as 100 per cent success, a translation is often more than 100 per cent effective, being an improvement on the source text which may have been written in great haste or with less skill in handling words. Translators, however, in earning their daily bread, are constantly constrained to sacrifice quality for time. Accuracy is less likely to suffer as we know a mistake is a greater crime than a poor turn of phrase. We can also work more quickly if we keep close to the original, thereby reducing the risk of error, than

if we step back from the job and rethink whole sentences or paragraphs in the target language. So if equipment can help us to save time we should be no less accurate, but the results should be better. We cannot hope to compete with computers for speed but they will have to run hard to catch us on quality.

Let us examine some of the 'electronic miracles' which can save our time and reduce routine activities.

Facsimile transmission

The strange garbles spewed out by telex machines often turn simple English into ambiguous nonsense and play havoc with foreign language texts, providing translators with insoluble headaches. Even an impeccable rendering is without often vital clues such as capital letters and accents, and strange abbreviated jargon phrases easily become meaningless to the uninitiated. Worst of all, the source is suspect; one knows it was written by a machine and is likely to be wrong.

Using a telecopier or other form of facsimile transmission you receive a copy of an original free of the apparently random quirks of a machine and spared mutilation by typists working in a language they do not understand. The need for transliteration is removed—a boon for users of Cyrillic scripts, Arabic and the ideographic languages which can now be transmitted by telephone line. A short straightforward translation can be given within minutes to a client or distant branch of a company, together with drawings or supplementary information, similarly the layout of the text can be provided. Any particular legibility problems, such as those of a handwritten text, can be clarified quickly, verbally, at the time of transmission. There is a variety of machines on the market with transmission speeds down to one minute for an A4 page.

Word processors

Not all translations are revised or even rewritten, but few translators would not welcome the chance of amending their first versions on a screen. Even the most conscientious translator avoids searching for neater turns of phrase when this means retyping a 700-word page. Errors, when spotted, will of course be corrected; erasing fluids are useful but far from perfect and the results are usually a compromise between what one would like to see and the time one can afford to spend achieving it. A translation typed on a word processor is stored on card, tape or floppy disc and it can be displayed on a screen, typed out by the machine or transmitted to another word processor via a telephone line.

To the user a word processor is like a typewriter, but the typed text can be revised or edited as required and retyped by the machine. A disc contains up to 150 pages which can be played back on paper in any required format with automatic centring, spacing and justified right hand margin ready for printing. Revision features include the ability of the machine to change a word or phrase each time it occurs in the text; e.g., if 'smoke-grey matt finish' had been written throughout a contract and it was subsequently decided that 'grey high-gloss coating' was preferred, on command the word processor would change the phrase every time it occurred. With a communicating word processor your text can be transmitted in its final form at a speed of 120 characters per second to another communicating word processor at the end of a

telephone line anywhere in the world. Not only do the interchangeable print wheels allow the use of ten and twelve pitch, proportional spacing or different typefaces on the same machine, but there are different wheels for foreign languages. Linked to a code computer your word processor can act as a terminal for receiving or sending information. A translator with a word processor could therefore use it as a terminal to link up with a data bank. He could also have a store of 'memory cards' for his personal glossaries or they might be provided by a central source to encourage consistency of terminology (especially useful for a number of translators working on the same or similar jobs in different locations). The scope for such equipment as a back-up to translation is enormous.

Data banks

If we start with the assumption that a translator is more intelligent—or should we say discerning?—than a computer, it will be easy to understand that a data bank for the use of translators is not the same as one designed for computers.

Common words with a plurality of meanings provide the greatest volume of work for lexicographers and the greatest headaches for programmers of machine translations.

Let us take the word 'head' as an example. It is easy to see that with no context to indicate the required sense, the word could mean (Beauchy) Head, the head of a firm, a head of hair, head a ball, head for trouble, a young head on old shoulders, a head for heights, lose one's head, and so on. *Harraps English-French Dictionary* devotes a two-column page to the eleven meanings of the noun, with as many again for the verb.

—*tête*,

—*esprit* (mind), 'it never entered my head';

—'head of celery' *pied de céleri*—surely more logical to say foot than head for the base?—or alternatively 'bring the matter to a head' *faire aboutir une affaire*,

—*rubrique* (heading),

—a selection of naval and geographical terms, 'to collide with a ship head-on' *aborder un navire par l'avant*, or *cap* (headland),

—the range of *chef* 'head of a family, company, etc',

—*pièces de gibier* (head of game), or *bon nombre* as a collective,

—*face* (of a coin)—once again French logic wins,

—technical uses such as *colonne* (of water), *volant de vapeur* 'head of steam', and others.

Differentiation between these French and English terms would present a mammoth task for the programmer but none of the uses is likely to confuse an experienced translator whose immediate recognition of the synonym for 'head' from the context and background indicates the sense, even if he is not familiar with the idiom.

It may be that the supplementary knowledge necessary for a computer programme to compete with the translator (this is the field of artificial intelligence) will be less than that which the man has gleaned on his road through life, but the human approaches his job as a ready programmed unit, aware that celery grows not upside down but from a club-shaped base and that footballers use their heads as well as their feet to propel balls.

Even the most experienced specialist in his field consults reference books at times. We are told that up to 60 per cent of a translator's time is spent on this task⁶ and it would be sad indeed if the work never exceeded his readily available knowledge, depriving him of the stimulus of stretching his experience into new territory. When a system such as the European Community's EURODICAUTOM, described by Jacques Goetschalckx⁴ is widely available and more comprehensive, search time will be considerably reduced. The Siemens TEAM System⁵, which links text processing and editing systems with the final phototypesetting, takes the process still further, providing a sophisticated back-up to the human operator whose expertise it uses to the full by eliminating routine mechanical operations such as dictionary search and retyping.

A data bank somewhere is all very well but I need it at my fingertips, you may say. In 'Designing a multilingual terminology bank for US Translators'⁶, Sara E. Morton tells us that the results of a survey of members of the American Translators Association indicated that on-line access to a terminology bank was no more favoured than loose-leaf updates arriving by post. This is surprising, but as a display terminal is clearly more convenient than a printout, once this facility is available and the cost can be eliminated, there is little doubt that this will be the preferred form of accessing a data bank. The more a system is used the cheaper it becomes and hardware costs come down when the equipment becomes commonplace. The day cannot be far off when every office and home will be equipped with a Viewdata system linking a TV screen via the telephone to an infinite variety of accessible information. The cost of funding a dictionary for translators in the form of an information store before it has been expanded into a commercially viable entity is clearly a problem, as both Morton and Goetschalckx point out. It would need to be fully comprehensive and highly effective to function properly and gain acceptance and income, but this is not an insuperable difficulty.

Newly coined terms present experienced translators with some of their greatest problems, to which must be added unusual combinations of words and special or possibly incorrect use. Such terms are absent from dictionaries because the lexicographer rejected them as not being sufficiently authenticated, permanent or acceptable on his publication deadline—to say nothing of words that have come into use since that date. Such material can easily be incorporated into a data bank with appropriate comments and be deleted or updated as usage crystallizes or changes. The amount and type of information provided for each entry will be defined, refined and determined in the course of time, possibly on the lines of the current system operated by the Brussels Terminology Bureau⁷.

The growing use of microprocessors and their consequent reduced cost can only serve to make information storage and retrieval more accessible to us all. Who would have ventured, when calculators first appeared, to predict that every schoolchild would have one as a matter of course, but who would lay money against that now?

If we take the principle of the 'Language Translator' which I derided at the start of this article, we have a pocket computer fitted with preprogrammed cartridges which can be bought like dictionaries, these may be supplemented with memory capsules to add personal or specialized glossary notes. Here then is the technical capability for off-line data banks. On-line information retrieval has been operating with increasingly widespread success and efficiency for many years already but when will publishers

start compiling dictionaries for this market? They surely do not expect us to continue with the abacus in the age of the calculator merely for the sake of tradition!

Automatic translation

I shall make no attempt to describe the numerous areas and projects involving automatic, machine or computer translation, as it is variously described, this has been done more competently and comprehensively than I could hope to, both admirably succinctly⁸ and in remarkable and fascinating detail⁹. What can, however, be clearly and briefly stated with regard to the possibilities of machine translation, is that for the present it is simply a matter of how much or how little pre- and/or post-editing of texts is acceptable. This is most clearly reflected in the cost of man-hours, but there are other sides to the question. Words, as we have seen, can have many meanings and even more nuances, but if we control our input by using a restricted vocabulary, limiting each word to a defined usage, the computer should be able to handle this material with a high percentage of accuracy.

Returning to 'head', our example of a word with many connotations, we list it in our controlled vocabulary as valid only in the prime meaning as part of an animate being; in its second sense we will use 'mind', which in turn must never be a verb, and we will have to say 'look after the baby', 'heed the step', etc.; we will call a 'head of celery' a 'root', and so on through the twenty-two meanings given by Harrap with the possibility of many further subdivisions. All words must be similarly treated, e.g. 'lift' may only be a verb, 'elevator' perhaps taking the noun function, or we could have 'raise' for the verb leaving 'lift' for the noun, but once it is established, writers must adhere to the discipline of the vocabulary. Such a form of English is currently on the market¹⁰ and in use by a number of companies in variously tailored forms, proving especially useful for instruction and service manuals. Whether it will ever reach a general level of acceptance remains to be seen. Habits die hard and I can foresee a considerable degree of psychological resistance from experienced writers to any such imposition of vocabulary. The way we express ourselves is more than just a matter of convenience; it is surely at the very root of our personalities. Consider the measure of hostility engendered by countries when they try to change or abolish the language of a minority group!

A text controlled in this way makes computer translation much easier and it also becomes child's play for a human¹¹. This form of pre-editing does not require a translator or even a skilled linguist, although post-editing, to be effective, almost certainly needs to be done by a translator. It will no doubt be possible to find people prepared to write in controlled language but it may be more difficult to persuade translators, used to working with 'real' language, to undertake the task of unavelling and correcting machine output.

This does not merely reflect a possible lack of enthusiasm on their part but the realization that a text was produced by a mindless automaton violates a very fundamental principle of a translator's work. When we puzzle over obscure passages—maybe a semi-legible letter from a remote corner of the world, a painstaking effort for someone with little formal education, or at the other end of the scale, an abstruse philosophical passage, part of the life work of a thinker, or a research paper by a scientist, all possibly unskilled as writers—the thought that spurs us on in the

struggle to resolve the mystery of the text is that this is a message from one person to another or to others. Translators are the intermediaries, faced with the privilege and responsibility of interpreting and reproducing the essential meaning of the text. When the words fail to do this adequately we invest ourselves with imagination, like archaeologists trying to decipher hieroglyphics, and ask ourselves what the writer wanted to say. We know he would not have bothered to write unless he badly needed to say something and by putting ourselves in his shoes, ninety-nine times out of a hundred we find the key and our readers never know that the original did not spell out the message clearly. But, faced with machine output, we may feel from the start that perhaps the machine has lost the meaning and we might as well refer to the original human version. By the time we have done this once or twice, we will be tempted to ignore the machine's efforts altogether.

Conclusion

What conclusions can be drawn from all this? One cannot overlook the fact that those best qualified to use machine translation systems are the translators themselves, but they are unlikely to relish sharing their skills with a rival. As translators we must realize, however, that if we are not to be superseded by machines we should make the most of the facilities available to improve our performance and keep ahead on a cost-effective basis, it is on this, coupled with the quality of our work, that we will be judged.

The interests of the manufacturers of electronic equipment are geared to mass markets rather than specialist users such as translators, but current equipment might almost have been designed for our needs. The average staff or freelance translator of yesterday sat at his traditional office desk or kitchen table with a manual typewriter. He has been replaced by the user of an electric typewriter with carbon ribbon, backed by an increasingly wieldy collection of reference works. The next stop will be a translator with a communicating word processor linked to a computer.

Let us look at this surely not-too-remote future. Reaching your desk in the morning you play out a text which has come in overnight from abroad and been stored in the machine. It is urgent. You type your translation. If there are any problem terms or if you wish to check usage in a particular context you access a data bank onto your VDU from a computer, on a time-sharing basis. You revise your work on the screen and decided on the layout, when you are satisfied, you phone your client and transmit the text at 120 characters per second. He takes your camera-ready translation out of his machine within minutes after you have finished working on it. This may be an electronic miracle but it is not a fantasy.

REFERENCES

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✧ A bibliographic system for solar energy ✧ information on the Middle East

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A bibliographic system has been developed at the University of Petroleum and Minerals, Dhahran, Saudi Arabia, for gathering, organizing and disseminating the solar energy information pertaining to the Middle East. This paper presents the structure of the system, and some facts and findings on solar energy information based upon analysis of the bibliography

Solar energy information—the need to act

IN RECENT YEARS, the Middle East has experienced increasing activity and interest in the development of solar energy as an alternative source of power. Not only countries like Turkey, Lebanon, Egypt and Israel that lack ample oil reserves, but also oil-rich countries like Saudi Arabia, Kuwait and Iran, all realize that, whereas oil will run out, their sunshine is an inexhaustible resource.

Solar energy-related activity has taken several forms. Institutions have been established to engage in research. Individuals and groups are pursuing small scale co-operation and exchange programs. Projects using Western technology have entailed large international research and development programs. The mechanisms to co-ordinate education and research are being set up. In particular, in the last few years several solar energy conferences (refer to Appendix A) have been held in the Middle East, the ensuing publications have contributed significantly to the science and technology of solar energy. (The most prolific authors and numbers of their publications are presented in Appendix B)

As activity in the solar energy field grew and the published information accumulated it became evident that more efficient processing and dissemination of data was necessary. Therefore, during our tenure at the University of Petroleum and Minerals, Dhahran, Saudi Arabia, we decided to gather, organize and disseminate the solar energy information pertaining to the Middle East in the form of a bibliography. Our primary purpose was to make available information on research activities, development projects, government policies, contract grants and published literature sources pertaining to or originating from this geographic area. Our sources of information

consisted mainly of papers taken from regional conferences, but also included publications found in the *Solar Energy Journal*, COMPLES (Co-operation méditerranéenne pour l'énergie solaire) magazines, and other, international conferences. Quite often the University's researchers contributed these papers from their own collections, or assisted in obtaining them from their colleagues in other countries. Besides these, we also used the Arizona State University Library's Solar Energy Index, and we searched SDC ORDBIT IV's and Lockheed DIALOG's major energy related data bases, retrieving literature sources originating in the countries of the Middle East, and later, the most prolific authors.

Following is a brief description of the bibliographic system we designed

Structure of the bibliographic system

As we were dealing with data of diverse nature, it became clear that we needed a computer to assist us. Computer programs covering all phases of the work were developed. They fall into three main categories: Data Entry, Data Validation and Conversion, and Processing. The system design is illustrated in Figure 1.

Data Entry is carried out by using an interactive program on the computer terminals. This program allows users with minimal computer experience to enter the raw data easily. It prompts the users at the terminals in several stages for information on

title;
classification,

source,
author's name and address.

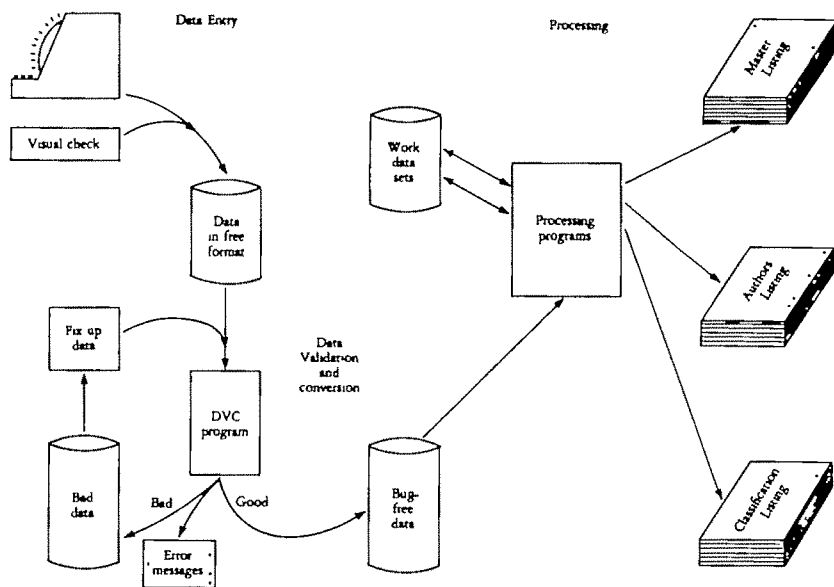


FIG 1 System design for Middle East solar energy bibliography

Figure 2 shows a sample data entry session.

```

      INTERACTIVE DATA ENTRY PROGRAM
      TO TERMINATE PROGRAM OR RE-ENTER A PAPER
      ENTER --> ***

      THE LAST RECORD THAT WAS FOUND IS

P A P E R 0496
INVESTIGATION OF THE PHOTOELECTRICAL PROPERTIES OF GALLIUM PHOSPHIDE
P-N-JUNCTIONS.
C: MAT-STUDY, PHOTO
S: BEN, SPECIAL PUBLICATION, 371-373

    OMAR, O. A.
    PHYSICS DEPT
    AIN SHAMS UNIV
    CAIRO, EGYPT
    EL-MUUSLY, M. K.
    PHYSICS DEPT
    AIN SHAMS UNIV
    CAIRO, EGYPT

      THE FOLLOWING ENTRIES ARE FOR PAPER 0495

### - ENTER IN THE TITLE (DON'T FORGET THE PERIOD )
? SUMMARY OF THE OPEN DISCUSSION ON THE ESTABLISHMENT OF A SOLAR ENERGY
? RESEARCH CENTRE.

### - WHATS THE CLASSIFICATION
? GEN

### - ENTER IN SOURCE, VOL# AND PAGE :
? BEN, SPECIAL PUBLICATION, 439-440

### - AUTHOR NUMBER 01
? HASSAN, K.
? ARAB DEVELOPMENT INSTITUTE
? TRIPOLI, A. R. LYBIA
?

### - AUTHOR NUMBER 02 (ENTER BLANK LINE IF NO MORE AUTHORS)
?

#####DATA RECEIVED#####
P A P E R 0495
SUMMARY OF THE OPEN DISCUSSION ON THE ESTABLISHMENT OF A SOLAR ENERGY
RESEARCH CENTRE.
C: GEN
S: BEN, SPECIAL PUBLICATION, 439-440

    HASSAN, K.
    ARAB DEVELOPMENT INSTITUTE
    TRIPOLI, A. R. LYBIA

#####

### - IS DATA OK? ( TYPE NO TO START AGAIN)
?

### - RECORDS HAVE BEEN SENT TO DATA SET.

      THE FOLLOWING ENTRIES ARE FOR PAPER 0496

### - ENTER IN THE TITLE (DON'T FORGET THE PERIOD )
? ***

      YOU HAVE TWO CHOICES NOW:
      TYPE 'AGAIN' - IF YOU WANT TO START THE
                   PRESENT PAPER ALL OVER AGAIN
                   OR --
      TYPE 'STOP'  - IF YOU WANT TO STOP
                   ENTERING DATA AND LEAVE
  
```

? STOP

FIG 2 Sample of Data Entry

There are two basic functions performed by the *Data Validation and Conversion* program. These are, as the name implies, validation of the raw data and conversion of the data into a more compact form for later processing. A sample of rejected data is shown in Figure 3.

P A P E R 0304

PERFORMANCE OF A V-CORRUGATED DIRECTIONALLY SELECTIVE SOLAR AIR HEATING.

C: HEAT-AIR,PER

S: TRIPOLI,SPECIAL PUBLICATION,167

CHAUHAN, R. S.
MECHANICAL ENGINEERING DEPT.,
PUNJAB AGRICULTURAL UNIV.,
LUDHIANA, PB.,INDIA

URB14 - A BLANK RECORD WAS FOUND BETWEEN THE P A P E R AND
CLASSIFICATION REC.NO BLNK RECS ALLOWED

P A P E R 0306

SUN POWERED AIR CONDITIONING BY ABSORPTION CHEMICAL

DEHUMIDIFICATION AND EVAPORATIVE COOLING.

C: COOL-AIR,DES

S: TRIPOLI,SPECIAL PUBLICATION,231-237

GANDHIDASAN, P.
SOLAR ENERGY LABORATORY,IIT,
MADRAS,INDIA.

GUPTA, M. C.
SCLAR ENERGY LABGRATORY,IIT,
MADRAS,INDIA.

URB19 - A CLASSIFICATION KEY DID NOT MATCH UP WITH THE MASTER LIST.

FIG 3 *Sample of rejected data*

The *Processing* programs produce three major bibliography listings

Master Listing

This is a formatted printout of all the records listed in numerical order according to their record identification number. A sample printout is produced on a 8½×11 inch computer paper as shown in Figure 4.

Authors Listing

This printout contains an alphabetical listing by authors and their corresponding published works. The title of the paper and its reference number in the master listing are printed beside the name of the author. Figure 5 shows an example of authors listing.

*****0011*****	
* MIDDLE EAST SOLAR ENERGY INFORMATION CENTER *	
* MASTER LISTING VOLUME 1 *	

IDENT#	TITLE,SOURCE AND AUTHORS
0425	THERMO-FLUID ANALYSIS OF A CYLINDRICAL SOLAR HEAT ABSORBER. -INTERNATIONAL SYMPOSIUM - WORKSHOP ON SOLAR ENERGY (FROM MEETING PROGRAM ONLY),JUNE 16 TO 22,1978,CAIRO,EGYPT// KHALIL, M.F. ALEXANDRIA UNIVERSITY ALEXANDRIA 75550,EGYPT
0426	STUDY OF A MULTI-PASS RADIATION FLUID-HEATER EXPOSED TO NON-UNIFORM RADIATION. -INTERNATIONAL SYMPOSIUM - WORKSHOP ON SOLAR ENERGY (FROM MEETING PROGRAM ONLY),JUNE 16 TO 22,1978,CAIRO,EGYPT// RAFAT, N.M. ELKOTB, M.M. CAIRO UNIVERSITY CAIRO UNIVERSITY CAIRO, EGYPT CAIRO, EGYPT EL-REFAIE, M.R. CAIRO UNIVERSITY CAIRO, EGYPT
0427	OPTIMUM INCLINATION OF LINEAR REFLECTORS. -INTERNATIONAL SYMPOSIUM - WORKSHOP ON SOLAR ENERGY (FROM MEETING PROGRAM ONLY),JUNE 16 TO 22,1978,CAIRO,EGYPT// KHALEFA, B.A. HEGAZY, A.S. MEOUFIA UNIVERSITY MEAUFIA UNIVERSITY SHEBIN EL KUM, EGYPT SHEBIN EL KUM, EGYPT
0428	SOLAR ELECTRICITY PRODUCTION. -INTERNATIONAL SYMPOSIUM - WORKSHOP ON SOLAR ENERGY (FROM MEETING PROGRAM ONLY),JUNE 16 TO 22,1978,CAIRO,EGYPT// KETTANI, A UNIVERSITY OF PET & MINERALS SAUDI ARABIA
0429	WIND ENERGY. -INTERNATIONAL SYMPOSIUM - WORKSHOP ON SOLAR ENERGY (FROM MEETING PROGRAM ONLY),JUNE 16 TO 22,1978,CAIRO,EGYPT//

FIG 4 Sample of Master Listing

0019

 * MIDDLE EAST SOLAR ENERGY INFORMATION CENTER *
 * AUTHOR LISTING VOLUME I *

REF#-PG. TITLE OF PAPER

- SABBAGH, J.
 458-018 UTILIZATION OF SOLAR ENERGY DESALINATION AND ITS DEVELOPMENT.
- SABBAGH, J. A.
 504-028 THERMO-CHEMICAL PRODUCTION OF HYDROGEN.
 651-053 WATER DISTILLERS IN RIYADH, SAUDI ARABIA.
 650-053 THE DEVELOPMENT OF SOLAR-WATER HEATERS IN SAUDI ARABIA.
 640-051 ESTIMATION OF TOTAL SOLAR RADIATION FROM METEOROLOGICAL DATA.
 659-055 ESTIMATION OF THE TOTAL SOLAR RADIATION FROM METEOROLOGICAL DATA.
 641-051 CORRELATION OF SOLAR RADIATION AND SUNSHINE DURATION IN RIYADH, SAUDI ARABIA
- EL-SABBAN, A. F.
 637-050 A NOTE ON THE SOLAR RADIATION PATTERN FOR THE UNITED ARAB REPUBLIC.
- SAFWAT, H. F.
 639-051 DETERMINATION OF THE OPTIMUM ORIENTATION FOR THE DOUBLE EXPOSURE FLAT-PLATE COLLECTOR AND ITS REFLECTORS.
- SATA, H.
 314-003 MATCHING OF SOLAR CELLS AND THE PERFORMANCE OF A SOLAR BATTERY.
- SAKR, I. A.
 613-045 A CHANNELLED SOLAR FLAT-PLATE BOOSTER.
 401-006 POSSIBILITIES FOR SOLAR ENERGY UTILIZATION IN EGYPT.
 510-030 FACTORS AFFECTING THE USE OF SOLAR ENERGY FOR COOLING.
 433-012 COMBINATION OF WIND AND SOLAR ENERGIES AT THE NORTHERN COAST OF EGYPT.
 473-021 SOLAR ENERGY PATTERN ON BUILDING VERTICAL WALLS OF DIFFERENT ORIENTATIONS.
- EL-SALAM, E. M. A.
 651-053 WATER DISTILLERS IN RIYADH, SAUDI ARABIA.
 650-053 THE DEVELOPMENT OF SOLAR-WATER HEATERS IN SAUDI ARABIA.
 640-051 ESTIMATION OF TOTAL SOLAR RADIATION FROM METEOROLOGICAL DATA.
 667-056 ESTIMATION OF DIFFUSE SOLAR RADIATION IN THE ARABIAN PENINSULA.
 659-055 ESTIMATION OF THE TOTAL SOLAR RADIATION FROM METEOROLOGICAL DATA.

FIG 5 Sample of Authors Listing

0004

```

*****
*           MIDDLE EAST SOLAR ENERGY INFORMATION CENTER           *
*           CLASSIFICATION LISTING                                VOLUME 1           *
*****
REF#-PG.  REF#-PG.  REF#-PG.  REF#-PG.  REF#-PG.  REF#-PG.
-----
REFLECTORS
0639-051
STORAGE
0503-028  0506-029  0604-043  0609-044  0623-048
SYSTEMS: DESIGN
0632-049
SYSTEMS: MODELLING
0476-022  0481-023  0482-023  0508-029  0530-035  0538-036
0541-037  0542-037  0543-037  0603-043  0611-045  0616-046
0621-047  0647-052
SYSTEMS: OPTIMIZATION
0619-047  0639-051
SYSTEMS: SIMULATION
0487-025  0511-030  0608-044  0631-049  0687-061  0689-061
0690-062  0691-062  0692-062
WIND ENERGY
0534-035  0617-046  0633-049
WIND: WINDMACHINE DESIGN
0480-023

```

FIG 6 Sample of Classification Listing

Classification Listing

The classification listing is a grouping of all papers under a common classification key. All records at the time of data entry are classified as belonging to one or more branches of an information hierarchy chart (e.g., SOLAR COOLING, APPL-DESAL-STL). Figure 6 shows a sample classification listing.

Unique features

Success in using the bibliographic system depends heavily on how the data input is handled. Commercial systems generally have a fixed input format which must be strictly adhered to if everything is to work properly. To handle the job of data entry correctly and efficiently, skilled personnel are required, from the key punchers who normally enter the data to the production programmer who has to ensure valid data and run the programs. Our data handling programs, however, have been designed from the user's point of view. Data is entered via an easy-to-use interactive program and the data is represented in a free-style format that makes it easy to visually check and edit by using the text editor. Secretaries, unskilled typists and even student helpers may enter the data with a minimum amount of instruction. We view this ease of data entry as the strongest feature of our system.

The peculiar problems of communication between the Middle East and the outside world have also deterred us from going to a ready-made system. If there were software problems, it would be rather hard to receive timely assistance. Furthermore, of course, since we developed the system ourselves we have been able to tailor the system to fit

our own needs. Should there be any further expansion or modification, we can handle it on our own without having to seek outside help.

The modification that we have in mind now is to merge the Data Validation and Conversion program with the Data Entry program. Merging both programs will provide a very sophisticated but easy-to-use data entry routine with a high degree of error checking. Since all the errors will be sensed at the time of data entry, session time at the terminal will be considerably reduced.

This bibliographic system has been developed from scratch on the existing IBM 370/158 system at the University of Petroleum and Minerals. The experience gained from this program will be of great significance in the future development of similar types of data systems in Saudi Arabia and elsewhere. A more detailed description has already been published.¹

Facts and findings

Based on the 368 publications found so far, the contribution of each country in the Middle East is as shown in Table 1. The Saudi papers are mainly published by professors in the University of Petroleum and Minerals, and the Riyadh University. The Egyptian publications are mostly derived from the Solar Energy Laboratory in the National Research Centre in Dokki. Israeli papers are mostly published in the *Solar Energy Journal* by researchers from several research institutions. The Kuwait papers are authored by workers in the Kuwait Institute for Scientific Research. Iranian works, like Turkish and Iraqi ones, are dominated by university professors.

TABLE 1 *Number of solar energy publications in the Middle East*

Country	No. of publications
Bahrain	0
Egypt	68
Iran	29
Iraq	19
Israel	52
Jordan	1
Kuwait	27
Lebanon	3
Libya	8
Oman	0
Qatar	1
Saudi Arabia	138
Syria	1
Turkey	26
United Arab Emirates	0
Yemen (North and South)	0
Total	368

Major subject areas of solar energy publication in the Middle East are presented in Table 2. The quantity of published papers has been included in the table to show the magnitude of work.

From Table 3, one can see that Egypt, Iran, Israel, Kuwait, Saudi Arabia and Turkey are the leading countries in solar energy publications. As the quantity of published works in each category is not listed in the table, the following descriptions are provided as additional information:

- Most of the publications found are related to solar thermal energy for water heating. We believe this type of simple and direct application of solar energy is also popular in other countries involved in solar energy application.
- The scarcity of fresh water in the Middle East attracts special solar energy application in water desalination and distillation. Basic research in desalination is carried out in Kuwait and Egypt.
- Jordan, although it shows only one publication in the literature, is ahead in several solar energy applications such as water heating, solar sterilization of soil, and desalination. There are two manufacturers of solar water heaters in Jordan.
- Israel leads other Middle Eastern countries in the manufacturing of solar collectors and hot water heater systems. The papers are found mainly in the *Solar Energy Journal*.
- Although several countries are involved in photovoltaic studies, the quantity of published work is quite limited and is confined mainly to laboratory investigations.
- We found a total of five papers, by Iranian and Israeli authors, on solar ponds. Solar energy used in the production of hydrogen was studied only in Saudi Arabia.
- Studies in chemical and bio-conversion are essentially non-existent. While there is no solar furnace in the Middle East, there is one paper by Iraqi authors discussing the feasibility of joining metal by using a solar furnace. There are some local measurements of solar radiation, but no measured radiation map based on a measurement grid is available for Middle Eastern countries. Currently, there is no

TABLE 2 Major areas of solar energy publication in the Middle East

Major subjects	No. of publications
Agricultural/rural application	15
Cooling	29
Desalination/distillation	30
Heating	32
Photovoltaics/solar cells	20
Radiation Data/measurements	33
Solar house	15
Solar power	20
System modelling	35
Total	229

TABLE 3 *Subject listing of solar energy publications in the Middle East*

Country	Agricultural/ rural application	Desalination/ distillation	Heating/ cooling	Water heating	Green- house	Photo voltaics	Collectors	System model	Power	Radiation	Storage	Coating	Solar pond
EGYPT	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
IRAN		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
IRAQ		✓		✓			✓			✓			
ISRAEL	✓		✓	✓		✓	✓		✓	✓	✓		✓
KUWAIT	✓		✓		✓	✓	✓	✓					
LEBANON				✓		✓		✓		✓			
LIBYA	✓			✓			✓						
SAUDI ARABIA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TURKEY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

- solar energy specialty magazine or publication in existence in this area.
- Sand, dust and humidity adversely affect the performance and the life expectancy of the solar collectors used in the area. Despite this, there are only a couple of publications dealing with the subject
- There were no papers published as a result of a conference held in Jeddah, Saudi Arabia. This was a serious oversight since it is very difficult to identify and acquire contributions from such a conference and some of the interesting papers may never receive attention

Conclusion

In the near future the contribution of solar energy to overall energy production will be minute but its long term prospects seem guaranteed. Thanks to the understanding of Middle Eastern government authorities, solar energy research and development are generously supported. This means, of course, more contributions to the literature of the field from the Middle East. We hope that our bibliography will make this solar energy information available to all interested users.

REFERENCE

- 1 CHEN, P I *et al* A bibliography system at the Middle East Solar Energy Information Center
In: Proceedings of the fifth Saudi National Computer Conference March 1979. pp 271-84

APPENDIX A *Major sources of publications*

- 1 Proceedings, Mechanical Engineering Congress (with emphasis on energy) 28 April to 1 May, 1975 Shiraz, Iran.
- 2 First National Solar Energy Conference (from Conference Program only). 21 to 23 January, 1978. Jeddah, Saudi Arabia
- 3 International Symposium—Workshop on Solar Energy (from Meeting Program only) 16 to 22 June, 1978 Cairo, Egypt.
- 4 ISEC Conference (Extended Abstract Only) 16 to 21 January, 1978 New Delhi, India
- 5 Proceedings, International Conference On Heliotechnique And Development September 1975 Dhahran, Saudi Arabia.
- 6 Proceedings, 2nd International Solar Forum 12 to 14 July 1978 Hamburg, Germany
- 7 The Middle East Solar Technology Exhibition and Conference (Abstracts only) 24 to 27 April, 1970 Bahrain.
- 8 Reprints, 1970 ISES Conference 2 to 6 March, 1970 Melbourne, Australia
- 9 *Solar Energy*, 1(1).
- 10 International Conference on the New Sources of Energy 20 to 25 November, 1978 Rabat, Morocco
- 11 Solar Cooling And Heating, A National Forum, 13 to 15 December, 1976. Miami Beach, Florida, USA.
- 12 Proceedings, Conference on the Physics of Solar Energy. 29 October to 3 November, 1976 Benghazi, Libya.
- 13 Abstract, ISES Congress, May, 1979 Atlanta, Georgia, USA.

APPENDIX B Major authors (authors with more than ten publications)

Bahadori, M. N. (12)

Elnesr, M. K. (10)

Kettani, M. A. (43)

Malik, M. A. S. (15)

Puri, V. M. (10)

Sayigh, A. A. M. (41)

Soliman, S. H. (11)

Tabor, H. (16)

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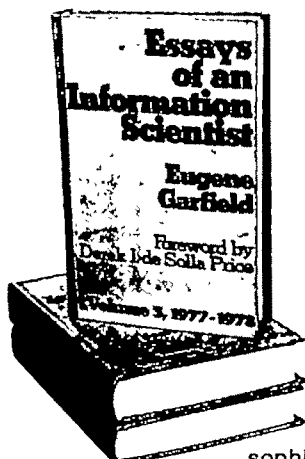
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THE LONDON CLASSIFICATION OF BUSINESS STUDIES

K.D.C. VERNON *London Business School*
and

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Second Edition revised by

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Liverpool Polytechnic*

and

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Information Studies, Liverpool Polytechnic*

This is the revision of a classification scheme which has had a great impact on business libraries and information services since its original development in the London Business School and is now used throughout the world. The revised edition, which is a thesaurus of indexing terms as well as a classification scheme for shelf arrangement, has approximately 4,000 terms. It will be a major source of reference for all libraries with any interest in business information, whether or not they use it for the arrangement of their stock and the compilation of their catalogues/indexes.

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ASLIB PROCEEDINGS

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Aslib Proceedings carries papers given at Aslib meetings and conferences, and contributed papers of interest to practising professionals. These describe innovations in information management techniques, applications of existing information products and services, and case studies of information units and special libraries. The contents of the journal are reviewed by an editorial board.

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Information systems in UK agriculture: final report of the Agriculture Information Review Committee

Gillian M. Craig

Agricultural Extension and Rural Development
Centre, University of Reading

Paper presented at the Aslib Biological and Agricultural Sciences Group Discussion Meeting, Aslib, London, 10 October 1979

THE BRITISH LIBRARY Research and Development Report *Information systems in UK agriculture*¹ presents the findings of a committee of fifteen agricultural scientists and information specialists, assisted by a research officer, who collaborated during the two-year period 1976-8 to review the information system in agriculture in the UK.

This paper is intended to draw attention to some of the main findings and recommendations of the report. The background and methodology of the project are described in detail in the report, and in a paper presented at a previous meeting of the Aslib Biological and Agricultural Sciences Group.²

The main aims and objectives of the project were

- (a) to review past and current research on the information system in agriculture in the UK;
- (b) to identify areas of concern and assess needs for research and development work on agricultural information,
- (c) to devise research projects which might lead to improved information provision for UK agriculturists.

I should like to start by presenting an overall picture of the information system in agriculture in the UK, and placing the committee's study of agricultural information dissemination in the right context.

UK farmers are the most important users of agricultural information, and the UK agricultural information system is the information distribution network which should enable them to obtain up-to-date information relevant to their businesses.

In the literature the distribution of agricultural information is often said to have three levels: research worker; adviser; farmer. This picture of agricultural information flow is greatly oversimplified but it suffices to demonstrate that, in agriculture, highly specific and fragmented pieces of scientific information are generated at one end of the system, while at the other, the agriculturists who advise and are in direct contact with farmers are trying to obtain practical information which can be applied by farmers and growers to their businesses. Information must be gathered systematically from many different sources and disciplines, and evaluated in technical, economic and farm management terms before it is in a useful form for general advisers to supply to farmers.

Having tried to demonstrate the difference of interests at either end of the agricultural information system I must remind you that the British Library project was concerned primarily with the information handling behaviour of all those individuals who directly and indirectly serve farmers and growers; the committee termed them 'agriculturists'. The project specifically excluded the flow of information between agriculturists and farmers, its aim being to review what is known about the information sources available to UK agriculturists, the information required and used by agriculturists, and the pathways of information flow between different categories of agriculturist.

The information system in the services sector of UK agriculture is extremely complex. It covers agriculturists working in research institutes, advisory services, educational institutions, manufacturing and service industries, media agencies and many other organizations in the public and private sectors. These agriculturists have varied job specifications and their information requirements cover nearly all fields of human knowledge. Different categories of agriculturist require information of varying scope and presentation for different purposes.

The agricultural information system has never been analyzed as a system—a means of distributing information from producers to users. Past research has provided very little useful data to allow even an understanding of certain parts of the system. The UK does not have a systematic and co-ordinated research programme for agricultural information research, and the current work is restricted to specific and separate areas.

Background information gathered during the project and presented in the report has helped to clarify some aspects of the UK agricultural information system, but questions remain to be answered about most features of the system, how it works and how well it works. Better information about the UK agricultural information system could, if it were available, provide a basis for a range of future decisions. The committee has therefore made a general recommendation that a research programme be initiated in which the agricultural information system is studied as a whole:

The process of distributing agricultural information should be examined systematically from the various producers to its users, the aim should be to understand in more detail how the agricultural information system works and where it works inefficiently. The study should.

- (a) determine available information sources in the UK;
- (b) examine the habits of agriculturists as information users;
- (c) investigate how the presentation and distribution of agricultural information relates to user needs.

Today I have not enough time to discuss all the committee's recommendation but I should like to draw attention to a few important issues which fall within the above framework.

Organizations generating agricultural information

The quantity and variety of agricultural information produced by numerous organizations inside and outside the agricultural industry is so great that most agriculturists have difficulty finding out what relevant information is available even before attempting to obtain it and read it.

Hundreds of organizations have agricultural interests, are centres of expertise in specific areas of agriculture and are producing useful information which is not available through normal book-selling channels. Many such organizations have specialist library collections and some operate specific documentation and information services. However, there is no comprehensive and up-to-date directory or central source of information on these organizations. Agriculture has many secondary services but no satisfactory tertiary service.

One of the committee's basic recommendations is that UK organizations which are sources of agricultural information should be examined in detail. Data collected in these studies should be maintained and made available to potential users by the most appropriate means.

Users of agricultural information

Most agriculturists seem to have difficulty keeping up-to-date with information relevant to their work. Many are reluctant to spend much time scanning current literature on a regular basis and prefer to rely on personal communication. Some are not aware of all the relevant information resources available to them but, in the case of others, it is questionable whether the information they require is available in a useful form.

The committee has identified different categories of agriculturist which it believes have different and fairly specific information requirements. The information needs and information gathering behaviour of these categories of user are described in general terms in the report. However, there are many factors, such as variations in available library and information facilities in different organizations, and personal attitudes and preferences, which modify these general characteristics and which could not be investigated in detail in the limited time available for the project.

The committee felt that insufficient is known about the information activities of agriculturists in their normal working environment. It has recommended that case studies of different categories of user be undertaken to ascertain the particular context in which information needs arise, the existing sources of information used and the use made of them, information needs and gaps in the provision of information. Users working in applied areas of agriculture have many information problems, and agricultural advisers, who are the main contact point between research workers and farmers, are one of the most important groups for study. The Committee has suggested that the flow of information between specialists and general advisers might be one of the first big areas for investigation.

User education

In general, agriculturists are not very systematic about searching for information and keeping up-to-date with the current literature. Many are unfamiliar with important information tools, systems and services, and most have received only limited training in information handling.

Very few of the university departments and colleges teaching agriculture provide systematic and formal instruction in information handling for their students and qualified agriculturists rarely have an opportunity to receive user education. The

committee has recommended that methods of improving user education for students of agriculture and related subjects be investigated, and it has suggested organizations and personnel who might be consulted on possible action to be taken.

The provision of user education for qualified agriculturists is more difficult than for students but the committee has suggested that methods of providing these agriculturists with some training in information handling might be investigated. Whether it is feasible to provide such training for qualified agriculturists is questionable, for their job specifications and information requirements are diverse, the information facilities and services available to them are extremely variable and much of the information required by some categories of agriculturist is not well organized for systematic searching.

Agricultural librarians and information scientists have an increasingly important role in assisting agriculturists to obtain information by the most appropriate means. The committee felt that there is a need for more professionally trained information staff to be employed in agricultural organizations.

To increase agriculturists' awareness of information systems and services outside their own organizations, the committee has recommended that more articles on agricultural information science be published in the agricultural and horticultural journals which are read by agriculturists. The recently formed Aslib Biological and Agricultural Sciences Group now provides a national forum at which those concerned with agricultural information can exchange experience and discuss matters of mutual interest, but local agricultural information groups can also improve contacts between agriculturists interested in information work. The committee felt that an Agricultural Information Co-ordinating Officer could play an important co-ordinating role by collecting and disseminating information on activities relevant to agricultural information, and by providing a point of liaison with all those concerned with agricultural information.

The presentation of agricultural information

The committee was unanimous in feeling that many agriculturists' information needs would be better satisfied if more appropriate review articles were available. The majority of agriculturists need reviews but those needing to integrate information from many disciplines at a practical level have an outstanding, and at present largely unmet, need.

The annual output of agricultural reviews is estimated to be only 10 per cent of the total agricultural literature. Coverage of the major agricultural subject areas by reviews is uneven and there are very few reviews in which the results of applied research and development are evaluated in a farming context and directed at the general advisers who are in contact with farmers. Furthermore, existing agricultural reviews are not always easily accessible to potential users.

The committee has recommended that the need for review articles in agriculture should be examined by monitoring the use of different types of review material by different agriculturists. It also endorses the suggestions for the stimulation of review article production made in the Commission of the European Communities (CEC) report on review articles in agriculture³ In an attempt to improve the communication of research and development results relevant to practical agriculture the Committee

proposes that more review-type publications, aimed at general advisers and teachers, and covering recent developments resulting from agricultural research and development, should be prepared during collaborative work among groups of specialist agriculturists from relevant organizations.

Mechanisms and systems for disseminating agricultural information

In agriculture, publishing and secondary documentation services are provided by a large range of commercial and other organizations whose activities are separate. Despite these many different services, a great quantity of non-scientific literature (technical, advisory and popular literature excluded from the Commonwealth Agricultural Bureaux data base), non-conventional literature (non-scientific and scientific information which is inadequately announced and publicized and is often not available through normal book-selling channels), data, information on current agricultural research projects and information on audio-visual materials used in agricultural education still lacks organized and systematic procedures for announcement, storage and retrieval. These are issues which have been discussed by the committee in some depth and which are subjects for research or action.

In particular the committee has recommended an investigation to determine how existing systems such as the East of Scotland College of Agriculture Information Retrieval and Awareness Service might be improved to provide an appropriate national awareness and retrieval service for the non-scientific literature. It has endorsed many of the recommendations made in the CEC report on non-conventional literature¹ and has recommended that suitable methods for implementing these recommendations be explored and developed in conjunction with the proposed work on the UK non-scientific literature. Sources of data and the potential role of data banks need to be investigated and the Committee has recommended that the Agricultural Research Current Information System (ARCIS) be improved and developed so that its coverage of current agricultural research and development projects in UK organizations is more comprehensive. Methods whereby UK agriculturists might retrieve information on current research from ARCIS also need to be investigated and the most appropriate method developed and promoted.

Conclusions

The quantity of existing agricultural information is so large and the variety so diffuse that much research and action are required to ensure that agriculturists know about available information relevant to their work and can obtain it easily. In addition agriculturists, particularly those working in applied areas of agriculture, need more review articles which select, collate and evaluate information on specific topics. Periodic reviews evaluating research and development results relevant to practical agriculture would improve the transfer of information from researchers to agriculturists who require information to be adapted to use on farms.

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Information or communication?

H. V. Wyatt

University of Bradford

Paper presented at the Aslib Biological and Agricultural Sciences Group Discussion Meeting, Aslib, London, 10 October 1979

SCIENCE WOULD NOT have been possible without a particular form of communication, which itself has changed over the years. Why has science flourished in our Judeo-Christian culture and not in others? We have very little idea, but certainly the Gutenberg printing press made the rapid dissemination of scientific work possible. For the first two hundred years of the Royal Society, science was the activity of the gentleman intellectual. In the history of infectious disease, the books and journals of the period 1840–1890 show how fragile science was, and how recent the present-day scientific paper is. Fact and opinion were intermingled; there was no refereeing as we know it; there was total confusion in the meaning and definition of terms, the presentation of data was long-winded, repetitious and illogical, with very poor tables and figures; and so on. The professionalism of science has occurred in the past hundred years; if we are not very careful, I think it may well be the last hundred years of science before a return to another dark age.

(Scientific papers perform five major functions:

- (a) the communication of results,
- (b) the storage of material for the archives,
- (c) the establishment of priorities,
- (d) visible cause for promotion, or, as the Americans have it, 'brownie points',
- (e) satisfaction of the urge to communicate.)

The British Library's Biological Information Review Committee¹ looked at the first two functions but had no time to explore priorities and urges—yet this is like studying Hamlet by going to see Rosenkrantz and Guildenstern. (The doubling of both the scientific literature and the number of scientists every fifteen years after 1700 created such surplus wealth from inventions that specialization and professionalism were necessary if science was to go on. But as de Solla Price showed,² the doubling has to stop and, for us, it has. The information explosion is nearly over; information scientists are trying to solve non-problems while science struggles with other ills. Scientists cope with the literature but science may not survive the information scientist.)

Threats to science

It is no accident that at the time when science has reached its peak in the UK there has been an increase in:

- interest in paranormal phenomena³ (Some of my science students believe in astrology; perhaps their faults lie in their stars, not in themselves.)

- courses and subjects which use the word 'science' but explore phenomena which are increasingly subjective;
- pressure for targeted research even though most experience shows that scientific problems are not solved by committees;⁴
- the sensationalism of science—the simultaneous publication in the media and the scientific journals of correlations which may or may not be causal (*e.g.* potato blight and *spina bifida*, now shown to be co-incident, not causal).

These threats are far more dangerous to the integrity of science than the information explosion.

The scientific paper

The Review Committee defined the scientific paper in terms of the copyright convention.¹ A better definition is quoted by Day⁵

[An acceptable primary scientific publication must be the first disclosure containing sufficient information to enable peers (1) to assess observations, (2) to repeat experiments, and (3) to evaluate intellectual processes: moreover, it must be susceptible to sensory perception, essentially permanent, available to the scientific community without restriction, and available for regular screening by one or more of the major recognized secondary services.]

Yet even this is deficient because the most important point for the scientist is that a paper is refereed. Refereeing is a complex system of vetting which does little to prevent the publication of mediocre papers while stopping the very bad. How far refereeing prevents the publication of new but heterodox ideas is difficult to discover: the editors of *Nature* told Gordon that they considered the publishing of faulty papers a less serious error than the publishing of good ones.⁶ How good is their judgement or that of their referees? Would the Watson-Crick paper have been published—and published so quickly—had it not been accompanied by a letter from Nobel-laureate Bragg? What would have been its fate had it arrived from an unknown college in Camden instead of the Medical Research Centre at Cambridge? The fate of potential paradigm-breaking papers in present times has not been investigated enough. It is generally believed that if refereeing were better and multiple publication were eliminated, the information explosion would be held in check. I doubt it, and even if it were true, the cost would be too high. The time of the really productive scientist would be further wasted on refereeing and spotting new referees. The mediocre scientist denied publication would fill his time with administration or teaching. Granting bodies assess applications partly by refereed publications; fewer publications would ease their work but the result would be more money to the top scientists to employ more disgruntled bench fodder. In the long run, the morale of scientists would decline.

De Solla Price calculated that 6 per cent of scientists contributed 50 per cent of all the papers,² so elimination of the low producers, who are presumably the poorer scientists, would not solve the problems. The problem of multiple publication is obviously not caused by 75 per cent of authors who produce only 25 per cent of the literature;³ it is the paradigm breakers and the leaders in a field who are guilty of

multiple publication. To write about your idea once is to consign it to oblivion. Semmelweis convinced his contemporaries of his views but wrote in only one journal and one (unreadable) book,⁷ so his ideas died with him. If you have a new idea, you must write and talk about it as often as possible; multiple publication is necessary for the progress of science, and is one of the hallmarks of the leaders of science, those in the invisible college

Most scientists are engaged in normal science⁸ or in technology. Normal science is firmly based on one or more past achievements and consists in fitting together the jigsaw puzzle; the results are usually clear and publishable but really rather dull and routine. It is the bread-and-butter science which is done because no-one can be sure, until later, whether it will be worth doing; it is publishable but perishable

Serendipity and reading

Serendipity is necessary not only for the experimenter and writer but also for the reader. The librarian and the information scientist have 'solved' information problems by circulating contents lists of journals and by devising junk schemes for cutting the numbers of journals. Instead they should have been on soap-boxes in every laboratory pressing scientists to read more and to buy more journals for their own use. How can we expect scientists to write decent prose if they only read journal titles? I would ban the printing of the contents of *Nature*, *British Medical Journal (BMJ)*, *Lancet*, *Science* and *New England Journal of Medicine*. These at any rate should be browsed or grazed by every serious scientist. Journals of high intrinsic interest and good literary style such as *Perspectives in Biology and Medicine* should be bought and read. Only with his own copy in his brief-case can the scientist find the time and serenity necessary to absorb ideas and style. I read for an hour a day on the train—micro-fiche journals would put a stop to that. I love reading the *BMJ*, for the oddments, the comments, the essay reviews, even the advertisements.

In January 1979 I compared my reading from the contents list of the *BMJ* as circulated by the library, with reading my own copy. In two weeks from the contents list alone I chose one item. From my leisurely reading of the journal I read in whole or part twenty-seven items: fifteen relating to teaching included an editorial, papers, letters, '100 years ago', 'advice', book reviews, etc. Five items were of general scientific interest and one of research interest. I photocopied one item, I wrote for an annual report which proved to be extremely useful, and I ordered one book for the library. Yet the library staff spend their time and our money on photo-copying and circulating the contents pages. They could instead offer cups of real coffee to the academics who really come to read.

Secondary services

The Review Committee thought there were too many secondary services, and that they were too dear and too much duplicated. A detailed evaluation of the many secondary services available to medical microbiologists⁹ shows that whatever duplication is apparent to the librarian, is not apparent to the publishing scientist. A survey (to be published) of the first authors of 100 papers netted eighty-nine replies; the majority of these authors use several of the available services. The services themselves are subtly different and are used in different ways and for different purposes.⁹

Instruction in the use of the literature

It has become fashionable to replace the subjective marking of practical and theory examinations by even more questionable marking of critical essays and projects lasting a term or longer. This change has been welcomed by librarians who have given instruction in the use of the biological literature and have seen an increase in interlibrary loans. I am not so happy. The experimental departments may well have saved some money but the increased cost to libraries has not been calculated; a preliminary survey by Mr J Carson will be submitted soon. There are jobs in biology for less than 50 per cent of those graduating; the majority, including many with higher degrees in biology, will get such jobs in marketing, the police, the civil service, etc. as they can. Instruction in use of the CROSS index of *Biological Abstracts* or use of *Science Citation Index* will have been largely wasted unless some principles of information searching have been acquired. The different ways of searching, by citation, unique registry number or specific name, by limited or unlimited thesaurus, by computer with its ability to add or subtract, should be presented, as they contain principles of universal application. I believe instruction in the tools for biological searching is better left for postgraduates. Instead I think we should concentrate more on teaching undergraduates to communicate and to evaluate the literature they read. A closer analysis of selected classical papers would be of far greater and more lasting value than the search for and hurried scanning of the latest effusions. Why can't the Sciences be more like the Arts? We could and should learn from our colleagues.

Conclusions

Scientists and information specialists must become more aware of how scientists communicate with each other. Information is desirable but insight must be wooed.

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Discussion

The audience of over fifty was composed mainly of information scientists and librarians drawn fairly equally from the biological and agricultural fields.

After some preliminary statements and general questions on the biological report, three major issues common to both reports were discussed: user needs and the need for case studies; user education; and the production of review articles. The discussion then turned to aspects of the agricultural report concerning popular articles, referral services and the role of an agricultural co-ordinator. Two practical points received attention—access to agricultural leaflets from the USA and the new classification scheme for MAFF publications. Where possible in the report of this discussion the items are referred to the reference numbers of the recommendations in the Biological Report (B) and the Agricultural Report (A)

OPENING REMARKS

MISS I MUIR (British Library) was invited to comment. She mentioned the fact that there were hundreds of copies of the reports available. She emphasized that the British Library wanted to receive suggestions, ideas on implementation of the recommendations and applications for research projects. Up to the time of speaking only ten communications had been received. Among the activities arising from the reports, the agricultural panel had arranged a series of seminars on their report. The British Library had had further discussions on user education with the Loughborough University Centre for Research on User Studies. Newcastle Polytechnic was continuing to promote its travelling workshop user education package. A project had started in support of CODATA on the compilation of an inventory of UK biological data centres as recommended in B.G.5. The Royal Society Scientific Information Committee was now the leading co-ordinating group active in the wider field of scientific information in general.

BIOLOGICAL REPORT

MISS CHILDS (Guy's Hospital Medical School) pointed out that there seemed to be a problem in disseminating information in the reports to biologists as well as information people working in the field. MR CRANE (MARS) replied that the biological report mentions this problem. He agreed that the agricultural panel's initiative in arranging seminars was a good idea, but nothing similar had been initiated by the Biological Review Panel. [Note added in press. The Biological Council had had a meeting on the report.] Furthermore, this panel was in a difficult position to pursue matters further as it was not attached to any institute to carry on its work. He expressed fears that since Prof. Jepson had died and he himself had moved on to another post and the dissolution of COBI (Committee on Biological Information) was a possibility, there was no viable body able to press for the implementation of the report's recommendations. [Note added in press. The Institute of Biology has approached the Aslib Biological and Agricultural Sciences Group seeking to establish a formal liaison with the Group to explore how to rectify this problem. Discussions are taking place.]

MISS FITZGERALD (Kew) drew attention to the inadequate coverage of taxonomic botany and asked if there were any comparisons available for existing equivalent

services in this field. MR CRANE stated that none were known to Miss Edwards who had been consulted in view of her involvement in the subject. DR WYATT (University of Bradford) said that the Department of Education and Science supported five research studies in information science. His research student had found many more secondary services in microbiology, especially in the medical field, in his one-year study. There is a lot of information available from secondary medical and microbial services, some of which could be of use to taxonomists and others. He suggested that a botany student would be eligible for a grant to research the problem raised and it would be very good training for a postgraduate.

MR DAVIDGE (Royal Holloway College) asked where SDI services in biology could be obtained in this country, apart from UKCIS. MR CRANE replied that repackaging had been recommended in B.S 5. DR WYATT agreed that lack of selection, for example, over 2,000 references in a print-out, was one of the major things which inhibited research scientists from using SDI services. The discussion ranged over the cost of SDI, the need for various kinds of repackaging and the different requirements in biology, as distinct from physics and chemistry, since attention has to be paid to differences inherent in varieties and strains, etc.

ISSUES COMMON TO BOTH REPORTS

User studies (B.G.1, B.S.1, A.3.3.1)

MR WILLS (Tropical Products Institute) endorsed the need for case studies in order to find out whether information is available to users in a useful form. There is evidence to suggest that it is not, in many cases. MRS CRAIG replied that the Agricultural Panel was divided as to which was the more important, studies of users, or studies of sources of information. When user studies are being carried out, an attempt should be made to determine the effects of library facilities and the effects of user education on the information-seeking behaviour of users.

Non-scientific agricultural literature (A.3.4.4)

MR WILLS stated that there is a need to establish a dialogue with the Commonwealth Agricultural Bureaux (CAB) regarding the widening of their data base coverage. Rightly, the CAB wish to maintain the integrity of their data base, based on selection for quality. But the user case studies referred to elsewhere might show that there is a viable market for information about those documents presently seen but rejected by CAB. In reply, MRS CRAIG referred to the findings of Gray (Commonwealth Veterinary Laboratory) on the comprehensiveness of coverage of the veterinary literature. US agricultural extension leaflets are added to the CAB library system, but are not covered in CAB, nor by other abstracting and indexing journals generally. The ESCA system should be developed as complementary to the CAB. It should include UK agricultural advisory-extension literature, and also popular literature, especially *Farmer's Weekly* articles, as even the better ones are not captured in any abstracting and indexing service.

Review articles (B.G.3, A.3.7)

MR BRIGGS (National Institute for Research in Dairying) asked to what extent requests of biologists and agricultural scientists feature in the studies and how had the division

been made between agriculture and biology. MR CRANE replied that agricultural aspects were excluded by the Biological Panel after consultation with Mrs Craig.

DR WYATT (University of Bradford) said that the British Library did not intend it, but biology was considered as a science and agriculture as a technology. The only way to differentiate is to look at the literature (as suggested by de Solla Price). Biological technology is largely pharmaceutical and is published as a science. In science there is refereeing of journal articles and citations. In technology there is little or no refereeing, few review articles and few citations—the author cites himself because there is little else to cite. Therefore the reviews are different because we are talking about two quite different needs and two separate communities. In science there is never a shortage of papers; in fact the flood has to be held back and the refereeing system improved to stem it. Technology is the opposite. Although we constantly want people to write reviews and papers, only scientists write them, because they are communicators and the technologists are not.

MR RUNCIE (ESCA) said that a science specialist in an advisory service needs a high degree of specialization, especially in keeping up to date in biology. If advisers are not communicators, then how do they get their advice across? The adviser takes science to the technologist. Our views and objectives about reviews need to be changed so that there is respect for the writers.

DR WYATT stated that an interesting development in recent years is the 'news and views' section of *Nature*, where a member of a panel of scientists is asked to write one page on a topic; but, unfortunately, many of these are totally unreadable. There is a place in science and technology for the two- or three-page review, such as the annual reviews of the London School of Hygiene and Tropical Medicine or the Medical Research Council. Cambridge biological reviews are eighty pages long and take four years to write, yet there is a place for these as well. What is important is communication. MR JACKSON (Science Reference Library) said that the term 'review', as used by *New Scientists*, for example, has become a jargon word; another word is needed to distinguish these 'reviews' which are written by scientific journalists for the general public. DR WYATT asserted that scientists as well need these popular reviews. MR WILLS stated that review articles were very important in his area of work. He favoured the idea of reviews of shorter length. In the case of *Tropical Science* the funding of larger review articles blocks too much of the writers' time, therefore shorter reviews which would take three to five days to write were favoured.

MR GRAY suggested that we can take the idea a step further—the classical abstracting and indexing journals are science-oriented. These journals will ignore short review articles; for example, a review article on pig diseases in a popular farming journal. If they are to be included the publishers will have to have a change of heart. MISS FITZGERALD (Kew) said that she found that *Advances in Veterinary Medicine* and *Animal Health* provide useful examples and give clear models of the two types of review articles. These are very different types of reviews written for very different audiences.

User education (B.S.7, A.3.8.1-5)

In connection with the problem of publicizing the location of the literature, e.g. US

agricultural extension leaflets at the SRL, MRS CRAIG asked whose job it was to instruct the user. MR JACKSON replied that there were leaflets available to advertize SRL's resources.

MR GOODIER (Agricultural Research Council) pointed out that many people in agricultural libraries have no professional training in librarianship or in information science (see A.3.8.6). [*Note added in press.* The Aslib Biological and Agricultural Sciences Group is in the process of setting up a working party on training.] MISS CHILDS pointed out that there was also a lack of training in how to look at articles critically, as well as in the art of communication (see B.S.7).

DR WYATT noted that the British Library had funded four workshops, but that it was not easy to get university staff to attend; they preferred to rely on the invisible college technique. MR JACKSON stated that the Newcastle package had been used at SRL, and that in two years he had instructed over 300 third-year biology students at Queen Mary College in this way. MR WILLS endorsed the need for user education for agriculturists other than students, particularly in the context of travelling workshops. (TPI has already been active in this field in developing countries and has obtained good responses and hard-working responses from librarians and research and development staffs.) MRS CRAIG was very much in favour of achieving more in the way of user education generally.

AGRICULTURAL REPORT

Availability of hard copy of non-conventional literature and the resources of the SRL (A.3.8.8)

MR GOODIER raised the problem of obtaining copies of non-conventional literature, such as USA leaflets which were often not available from British Library Lending Division, and suggested that a union catalogue of this type of material was needed.

MRS CRAIG mentioned that the report recommended that existing organizations such as CAB, SRL and MAFF could provide referral services. The British Library was not effectively publicizing its resources. DR DRON (SRL) maintained that the role of SRL within the British Library had not been brought out in the Reports. MR JACKSON pointed out that SRL is a referral service with a massive literature stock and that USA state agriculture publications were held at SRL (Bayswater) rather than at the Lending Division. DR LEIGH (SRL) stated that at SRL both the specialist staff and the literature were available. The staff had recently been reorganized into subject groups and user services groups. For bibliographic and other enquiries one could telephone, write or visit. Unfortunately SRL uses a different type of photocopy form from that in use at the Lending Division. It was suggested that a Group visit be arranged to SRL specifically to see the collections of biological and agricultural literature. [Two visits have since been arranged.] MR ELLESWORTH (Seale-Hayne Agricultural College) suggested that there should be a guide to SRL resources.

MAFF publications

MR GOODIER asked if there was any explanation of the new classification system for MAFF leaflets. MR BUSH (MAFF) commented that MAFF library is also

suffering—MAFF Publications Department had departed from an efficient system to a particular system of letters; as a result of constant protests they were now more or less returning to the original system. The new arrangement was to be 'leaflets', 'booklets', 'reference booklets', the distinguishing feature being the thickness of the publication. He had asked that this system be publicized.

Agricultural information co-ordinating officer (A.3.8.10)

MR WILLIS endorsed the need for an agricultural information co-ordinating officer. Though there are obvious organizational difficulties in funding the post, the proposal merits serious consideration because, professionally, we lack a focal point in our work. MRS CRAIG replied that she had spoken to Dr Pinnock of the British Library at the first of the agricultural seminars in Oxford recently and understood that the British Library could support an information officer, but a discipline-oriented information officer in agriculture would not be within its terms of reference. The support for that would have to come from elsewhere, for example, from the Ministry of Agriculture.

Agricultural and biological information—some remarks

K. V. Runcie

Director of Extension Services, East of Scotland
College of Agriculture

Paper presented at the Aslib Biological and Agricultural Sciences Group Discussion Meeting, Aslib, London, 10 October 1979

I AM PLEASED and honoured to be asked to speak, but I speak with some trepidation as I have not always been the most active library user. Perhaps this is a good thing in the light of the Report of the British Library Review Panel on Agricultural Information! I am committed to the user end of the spectrum—providing information to the agricultural advisers. The information I want is biological and economic, I am also interested in its applicability and ease of use vis-à-vis farmers. I and the other members of the British Library Review Panel on Agricultural Information are therefore interested not just in biological information, but also in the economic context and other contexts, whereas the British Library Review Panel on Biological Information has worked within the framework of biology. I am therefore very interested in Dr Wyatt's paper.

I am speaking with three hats:

- 1 as a member of the British Library Review Panel on Agricultural Information;
- 2 as one in charge of an organization that (i) uses information at different levels (advisers, specialist advisers, scientific specialists), and inevitably, (ii) produces information for different levels of staff and users;
- 3 as an individual who has been hard pressed all my working life to give advice, and who has had to rely on quick ways of getting the right answer most of the time, living on my wits or on the library. Many advisers live on their wits, out on a limb. They accept approximations. A lot of the literature produced is concerned with precision and purity but users do not always want decimals to the second place and are content with less than 95 per cent probability. The classic academic fraternity therefore causes us problems.

There are two aspects to *the philosophy of supplying what the user needs* (i) the ways and means, and (ii) the use of existing organizations, posts, etc. The Agricultural Report has been criticized in retrospect in the expectation that the British Library Research and Development Division will carry out all the recommendations. It is hoped that either the British Library will have enough money to do all that is recommended in the Report or that people in the field will actually start to do some of it themselves, being stimulated and guided by the recommendations. There must be self-help. Money will be short, so all our organizations—Ministry of Agriculture, Fisheries and Food; Agricultural Development and Advisory Service; Colleges of

Agriculture, Agricultural Research Council; Commonwealth Agricultural Bureaux must modify their systems with what resources they have. Their staffs ought to look at recommendations and make them work and not expect the British Library to do everything.

Information is useless unless it is used. If we can spend £75 million on research in technical matters then surely an appropriate percentage should be spent on making the information cost-effective (assuming it can be made so). Disseminating the information is possibly a losing battle. Part of the problem is that the information channels are clogged up with irrelevant information. At the user end, the irrelevant sometimes gets into the system, whereas to those at the 'sharp end' in the agricultural industry—advisers, teachers, trade representatives, etc.—more value can be obtained from what users would deem irrelevant, for instance the non-conventional literature. As users we cannot reduce what goes into the system, but there must be more efficient ways of getting it out. We must think of more ways and means of doing useful things.

I will go on to discuss what I consider to be *the major issues from the applied end of the agricultural spectrum*:

1. *User views*. Two basic premises can be made. It is irrelevant in carrying out user surveys simply to ask users what their needs are. If they do not know what is on offer, how can they perceive it as being useful? For example, advisers with their shoe-box index in the office have got to be shown what is possible. User education needs to be geared to the user's experience. It is possible to experiment with ways of showing users what is available. Secondly, research is notorious for overselling an underdeveloped idea. So amongst practitioners there is great suspicion of computerized information retrieval systems, certain abstract sources, and also of review articles as many of them are presently written.

2. *Precision versus approximation*. Many agriculturalists and scientists are trained in precision, but, in the real world, such precision is not always needed. Scientists are experienced in using their own judgement to find the answer, or to establish a point or view, so they are suspicious of information—condensing tools. They like to see the original. In contrast, because many advisers, teachers and trade representatives are very busy, they either take one or two references and concentrate on these as fact, or ignore new developments and advise from what is 'known'.

3. *Qualified retrieval systems*. We must sift, condense and qualitatively score information. With computerized information retrieval systems this is especially so. The possible mechanisms to achieve this are producing qualified retrieval systems, and reviewing in various ways and at different levels. Some scientists apply precision in the wrong way and at the wrong time, especially in connection with review articles. These often contain too much information, or they have overly large bibliographies because of the author's lack of selectivity in dealing with the profusion of references. What is needed are qualified retrieval systems where some references are asterisked, indicating what to read if there is only time to read one or two articles or abstracts.

4. *Review articles*. We must have review articles. Relatively few are written because no credit is given for writing them, and the long delay in publication reduces their usefulness. Those that do get credit are precise and short. The specialist advisers, for

example, are largely failing to do what they should be doing, that is, reviewing to meet the needs of colleagues in the field, because no one is telling them to do this. They should be sifting, condensing and qualitatively scoring, giving a value judgement. There are some good sources of reviewed information from advisers with experience who have their own network for information gathering. We should endeavour to avoid duplication. The representatives of the trade will look at reviews to promote their type of product. We need to operate a good reviewing system. Obviously there is the library and information contribution, but how much of the subject knowledge can be acquired by these people? Some people come in from the technical side to supplement the information science side. Reviews for applied scientists, specialist commodity advisers and generalists require greater critical input. There is not nearly enough effort put into this. One of the greatest weaknesses is in the publicly funded sector.

5. *Non-conventional and non-scientific literature.* For East of Scotland College of Agriculture advisory staff this is a very important source of information. They often get the best and most useful information from non-conventional literature. For the librarian and information scientist there are indexing and value judgement problems with this type of literature

6. *User education.* There is not much hope of changing the habits of people with thirty or forty years' experience. We should concentrate on the students of today and get them to make better use of the information and services available.

In summing up, I would like to emphasize that the highlights of the report, from my point of view, are:

- identifying the needs (knowing the usefulness of what is on offer). A complex network exists. Initially four or five types of needs should be identified.
- determining how these needs can best be met; carrying out experimental work and development work.
- putting effort into review articles with certain different objectives.
- improving and extending information retrieval systems in the applied field. We must be enthusiastic to make science work usefully for us.
- only when we have a working system, promoting user education.

NOTE

This resumé of Mr Runcie's paper was prepared by A Lumley of the Centre for Overseas Pest Research.

Toxic substances in the workplace—the role of the HSE

Pat Moody

Press Office Library, Health & Safety Executive,
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Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

AS A CIVIL servant opening an afternoon devoted to access to information, I couldn't resist the temptation to quote a now famous paragraph from the minority report attached to the 1973 Kilbrandon Report of the Constitution, which discussed the whole question of official information:

'It is not in the nature of governments and their bureaucracies, to provide people with more information than institutional and other pressures can prise out of them.'

I hope very much that I can show that in the Health and Safety Executive (HSE), at least, there is a willingness to give people information without it having to be prised out of us.

In fact, we commonly hear complaints that we are swamping firms with health and safety information whether they want it or not! In general, the only restrictions are those imposed by lack of staff to deal with enquiries, lack of suitable accommodation in our libraries for use by personal visitors, and, of course, lack of money, especially now in this time of cut-backs all round.

The aim of this talk is to give some idea of HSE's involvement in the field of toxic substances; to tell you what kinds of published guidance are available and how to get hold of them; to tell you what help is available to the public through our library and information services; and to give some idea of planned future developments in HSE's information activities.

HSE—its operation

But first, a brief word about HSE itself. . . . In 1974, the Health and Safety at Work, Act was passed, bringing cover to some eight million more people at work than was previously the case. It is an enabling act, superimposed on existing health and safety legislation such as the Factories Act and the Offices Shops and Railway Premises Act, which means the main provisions of the old legislation remain in force until such time as they are replaced by new regulations.

The Health and Safety Commission, set up under the Act and consisting of a full-time chairman and up to nine part-time members nominated by the TUC, the CBI and the local authority organizations, submits proposals for new health and safety regulations to the Secretary of State for Employment.

The Health and Safety Executive is the operational arm of the Commission. It does the donkey-work connected with the legislation, i.e. the drawing up of proposals; the collecting of opinions and suggestions from the industries and unions concerned; the re-drafting into a form acceptable to the Commission; and, finally, the enforcement of the new regulations.

The policy branches at HSE headquarters do the paperwork. They also co-ordinate and submit UK views on EEC directives in the health and safety field.

The eventual enforcement is the province of the various inspectorates which came together under the HSE umbrella after 1974. These are: the Factory Inspectorate; the Mines and Quarries Inspectorate; the Nuclear Installations Inspectorate; the Alkali and Clean Air Inspectorate; and the Agricultural Health and Safety Inspectorate.

All branches and inspectorates have an advisory role, as does the Employment Medical Advisory Service (EMAS).

The Inspectorates are organized on an area basis. There are twenty-one HSE Area Offices in the country, each with an Area Director and support staff. These offices are the initial point of contact for all inspectorates operating in the area, even though some offices may actually be located elsewhere.

(A leaflet is available giving addresses, telephone numbers and details of the geographical areas covered by each. There is, too, a leaflet on the EMAS regional network, again with office addresses and the areas covered.)

The part of the Health and Safety at Work Act most relevant to toxic substances is Section 6, which places upon manufacturers, importers and suppliers the responsibility for avoiding risks to health from their substances when used in workplaces.

In addition, on 1 October 1978, regulations came into force which gave a potential 150,000 union-appointed safety representatives (130,000 of which have already taken office) the right to act as an official channel for information on any hazard to which they or their colleagues might be exposed at work. Information on chemical hazards comes high on their list of requests to management, and the publishing programme of HSE is intended to make available in an easily obtainable form as much basic information as possible.

TUC-organized training courses help to give these 'safety watchdogs' some idea of what there is to find out and how to set about doing so.

Perhaps a fairly clear way of explaining how HSE goes about its task in the field of toxic substances is to ask you to think of it in Shakespearean terms. I am going to plot, from the cradle to the grave, the 'seven ages of a toxic substance'.

1. New chemicals

One of the major pieces of legislation in the field is working its way slowly towards the statute book: the notification of toxic properties of new substances scheme.

Proposals were published as a discussion document in early 1977 by the Health and Safety Commission, briefed by its Advisory Committee on Toxic Substances, which, like the Commission itself, is composed of members from both sides of industry.

The scheme requires manufacturers to assess the effect of their product on the environment and on human health *before* it is put on the market.

In the last ten years approximately four million new chemicals have been identified. A figure of £100,000 was recently put on the cost of carrying out full tests for the

carcinogenicity of a single substance using animals, so you can see that the costs involved in a notification scheme for dangerous substances in future could be phenomenal. *Useful* innovation should not be limited, and compromise solution to keep down costs to an economic level lies in quick short-term tests on bacteria instead of animals, using the results of these tests to determine which substances should be subjected to the full-scale animal tests before acceptance. HSE does not intend to produce guidelines on how to test new chemicals, but merely to indicate what data would be needed as basic information for an evaluation of the properties of such substances.

HSE representatives have been sitting on the EEC committee which has just published its Sixth Amendment to its Directive on the classification, packaging and labelling of dangerous substances. UK regulations on notification have been held up pending publication of the EEC document, so that they will be in line with it when they eventually appear.

Industry generally is not happy with a notification scheme which might give competitors access to information on their products, and the success of the scheme may depend to a great extent on the trust which manufacturers feel they can put in HSE not to reveal confidential information.

2. Bulk manufacture

The second stage in the life of a substance is its manufacture in bulk. Here HSE's involvement is operational. The Factory Inspectorate (with the support of mobile laboratories for on-the-spot analyses) can halt any process which is endangering workers' lives or health.

Take the case of the dioxin scare in this country after the TCDD (Tetrachlorodibenzo-p-dioxin, a herbicide) disaster in Seveso in 1976. HSE took action to prevent the further production of a similar chemical in the Coalite plant in Bolsover until it was completely satisfied about the safety precautions.

3. Packaging

Once in production, the substance enters stage 3 at which it has to be packaged for marketing.

HSE's 'Packaging and Labelling of Dangerous Substances Regulations 1978' spell out in detail which substances must carry warning labels; what labels they must carry; what risks are attached to them; and how prescribed substances must be packed.

There is a guidance booklet to accompany these regulations, and a poster campaign was run to coincide with their publication.

4. Transport

Transport is the next stage, and here again HSE has produced regulations on bulk transport in tankers, together with a guidance booklet.

These require road tankers to be marked with standard hazard warning panels, giving the name of the substance; a contact number to ring for advice in case of accident; and codes to indicate to fire and rescue services just what kind of hazard they are dealing with.

Publicity arranged by HSE included a dramatic poster and a film which tried to impress upon people the need to keep well clear of vehicles marked with the diamond-shaped warning labels.

There are now fresh proposals, to include forms of transport other than bulk road tankers, which are being considered by the industry and others concerned, so that their views can be taken into account when the regulations are proposed to the Government.

5. The workplace

Stage 5 of HSE's involvement is concerned with the use of toxic substances in the workplace.

Lack of knowledge, lack of regulations, lack of enforcement of regulations, and lack of regard for the well-being of workers in the past, mean that there are now a great many toxic chemicals in use throughout the manufacturing and service industries.

There are several ways in which toxic substance can enter the human system: via the lungs by being inhaled in large or small amounts; via contact with the skin; by accidental swallowing or gradual ingestion through contaminated food or drink.

Employers are obliged to inform employees of any hazard, and guidance from HSE comes in the form of a series of Guidance Notes on individual substances, such as, for example Trichloroethylene (TRIKE), a solvent used in dry-cleaning and degreasing, and Isocyanates, widely used in the plastics industry. The information contained in these notes includes:

- (a) chemical information and synonyms
- (b) industrial uses
- (c) the known health hazards and symptoms
- (d) special dangers when mixed with other substances
- (e) precautions to be taken, e.g. ventilation, personal protection
- (f) methods of detection
- (g) medical supervision of workers
- (h) first aid measures
- (i) training for employees
- (j) disposal of waste
- (k) legal requirements, i.e. special regulations applying to use
- (l) sampling equipment available.

Every year, HSE brings out in the form of an up-dated Guidance Note, the Threshold Limit Values for chemical substances in workroom air. This document lists the limits adopted at its annual meeting by the American Conference of Government Industrial Hygienists. Details of any differences between levels adopted by the Americans and those adopted by the UK are indicated in the introduction and in the appendices. The 1978 list contains recommended threshold limit values (TLVs) for airborne concentrations of over 600 potentially harmful substances. The TLVs are expressed in two forms:

TLV-TWA is the concentration to which workers may be exposed on a Time-

Weighted Average for eight hours a day over a 40-hour working week;
and

TLV-STEL, which is the Short-Term Exposure Limit, or maximum concentration to which a worker can be exposed for up to fifteen minutes without suffering intolerable irritation, irreversible tissue change or mental confusion.

In addition, many substances are given 'C' rating, indicating that this is the ceiling limit above which workers should not be exposed at all.

Individual tolerance varies with age, weight, smoking habits, etc., so the TLVs are not absolute. HSE policy is to recommend that levels of any potentially harmful substance should be kept as low as is reasonably practicable where some exposure is unavoidable.

Some substances are banned altogether under the Carcinogenic Substances Regulations, and these, too, are listed in the Guidance Note.

A field of very special concern is that of hazards to the unborn children of women workers. Damage to the foetus can occur when certain chemicals are absorbed into the system. There are special regulations, for example, governing women workers and processes using lead. Other substances, the mutagens, can even cause genetic damage which is then passed on to future generations.

Guidance for non-factory workers such as farmers and growers comes in the shape of safety leaflets and booklets. 'Poisonous Chemicals on the Farm' is a 1978 production, which details the hazards and safe methods of use of pesticides in agriculture and horticulture. A recent HSE film, 'One Man's Poison', tries to put over the same message in a humorous way.

The local Factory Inspector or Agricultural Inspector may be called in by employers or employees to advise on or to enforce regulations. The Alkali Inspector is called in where a certain type of scheduled process is emitting an offensive substance into the air. The work of the Alkali Inspectorate is well illustrated in the HSE film 'The Sky is a Canvas', which takes as its starting point the grey industrial skies of Lowry's paintings and shows what can be achieved in the field of industrial air pollution.

6. Medical aspects

Closely connected with Stage 5 is Stage 6, which I would describe as the medical aspects of working with toxics.

EMAS, the Employment Medical Advisory Service, publishes guidance in the form of leaflets and guidance notes. The one on 'Mercury—medical surveillance', for example, gives the properties and TLV for mercury and possible sources of exposure. It describes the clinical and biological effects, and explains how the diagnosis of mercury poisoning is made. It lists the desirable methods of surveillance of workers exposed to mercury and mercury compounds, and it also includes a short bibliography on the subject.

EMAS carries out epidemiological studies of groups of workers exposed to particular hazards. Surveys by EMAS personnel have been published on vinyl chloride, asbestos, and cancer in the rubber industry. These studies usually appear in medical journals rather than as HSE publications. Many are listed in the annual reports of EMAS.

The HSE film 'Health at Work' describes the work of the Employment Medical Advisory Service.

Recently, a new unit was formed within EMAS. The Occupational Health Information, Data Appraisal and Epidemiological Branch, set up by Dr David Douglas, and now headed by Dr George Sorrie, has the task of collecting and weighing up all available data on the health risks of any substance used at work, and of advising the Commission of the health implications of workplace use, so that those affected can consider the acceptable level.

The Occupational Hygiene and Medicine Laboratories at Cricklewood provide facilities for the analytical work involved in the surveys. (In 1977, Cricklewood received over 28,000 samples of blood or urine to test for toxic materials or for biochemical changes caused by exposure to them.)

The unit has access to an in-house data base known as 'Composition of Proprietary Substances'. Information is given voluntarily and in confidence by manufacturers, and the commercial confidentiality of their information is always respected.

Workers exposed to known toxics such as lead, cadmium, etc., can be screened regularly by means of urine or blood tests, and so can be taken off a particular job until the level of the contaminant in the body drops.

With suspected cancer-forming substances, EMAS's problem of assessing risk is far more difficult, as is the problem of the 200 or so known agents causing industrial allergies such as asthma and dermatitis.

7. Waste disposal

On to the final stage in the life of a toxic substance: its disposal as waste. . . . Here HSE liaises with the Department of the Environment and local authorities under the Control of Pollution Act.

You may recall the fuss that was made when a firm called Re-Chem took on a contract to incinerate and thus render harmless a large quantity of a lethal chemical called KEPONE which had been banned in the United States after a disastrous contamination incident, and which was to be shipped to Wales for treatment. HSE stepped in and prohibited the whole process before it even got under way, until they were satisfied that the substance could be handled or treated in absolute safety.

There have been other examples abroad which have heightened British awareness of the dangers, and in this country a couple of years ago a council worker died after accidentally inhaling toxic fumes from substances dumped illegally on a waste tip at Pitsea in Essex.

In the film 'The Sky is a Canvas', the Alkali Inspector steps in when a workman is overcome by toxic fumes while taking part in the illicit night-time burning off of the plastic sheathing on scrap cables.

Access to information

Having outlined the involvement of HSE in toxic substances at seven different stages, I would like to talk now about access to the information and guidance material I have mentioned.

The key to published guidance is the HSE Publications Catalogue. It costs £1 from

HMSO, and is a subject index to existing regulations, reports, guidance material, placards, etc., put out by HSE or its predecessors since 1969. It is constructed with cross-references to broader, narrower and related terms. ISBNs are given where available. The prices are not given in this first edition, but it is planned to include them in future.

The catalogue is produced by printing out our computerized index. At HSE we have on-line access to the index which is regularly up-dated, so if you wish to know whether anything has been published since the catalogue last came out, you have only to get in touch with our library service and a quick on-line check will be made on your behalf. The on-line index is being widely demonstrated on our stands at major exhibitions round the country.

Eventually, terminals will be installed in all our libraries and Area Offices. In addition to giving on-line access to the publications index, these terminals will give access to the HSE libraries' catalogue of holdings. Card catalogues are being replaced by the computer catalogue, which will, we hope, eventually be available on microfiche.

Also being fed into the data base are the results of our current awareness scanning of nearly 1,000 periodicals and abstracting journals. The resulting SCANS (Selective Current Awareness Newssheets) covering five separate topics initially, will be available to outside subscribers as soon as the new system has got over the inevitable teething-troubles.

Our libraries have access to commercially available external databases such as TOXLINE, MEDLINE, etc. for on-line searching, through BLAISE and DIALTECH.

Apart from the library services and publications available from HMSO, there are two other avenues worthy of mention. For £50 per year, anyone can subscribe to the HSE Bulletin Service. The Bulletins are batches of material recently put out as Press Releases, giving news of publications or activities of the HSE and HSC. Initial approaches should be made to our Enquiry Point which is at Baynards House, Chepstow Place, London W2 4TF.

The second avenue, which is still very much in the experimental stage, is Prestel. So far, the information available from HSE on Prestel is fairly general and not specifically on toxic substances. It has been decided not to include anything as complex as the Threshold Limit Values, as these are open to misinterpretation by the layman. However, Prestel will indicate the existence of regulations and guidance material in particular areas, and will give essential information such as addresses of local HSE offices to which enquiries can be directed.

Pat Moody, Press Office Librarian, Health & Safety Executive, London

The Toxicology, Information Working Party—an exercise in user collaboration

David Bawden

Pfizer Central Research, Sandwich, Kent

Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

THE TOXICOLOGY INFORMATION Working Party (TIWP) was set up following a joint meeting of the Association of Information Officers in the Pharmaceutical Industry (AIOPI) and the UK Online User Group (UKOLUG), held at Pfizer Central Research, Sandwich, in early 1979, to discuss problems of chemical toxicology searching. A strong feeling emerged from this meeting that some co-operative action among users to improve information provision in this area was both possible and highly desirable. The TIWP was set up, under the auspices of AIOPI and UKOLUG, to investigate this possibility, and to initiate suitable projects. We review here the activities of TIWP during its first six months of existence.

There are several important aspects of chemical toxicology information which should be noted¹. For the purposes of TIWP, the subject area is defined as all harmful effects of chemical substances in humans and animals, and related experimental studies, e.g. mutagenicity. Chemical hazards, to both laboratory and process workers, are included, but complex specialities, such as side-effects of drugs, cannot be considered in detail. This is an area where the requirements for information provision have increased dramatically in recent years, particularly because of legislation, and in which information workers in many environments (pharmaceutical and chemical industry, medical and academic libraries, government bodies, etc.) are liable to be involved. It is an area where completeness of retrieval and reliability of materials found are vital. It requires searches of many types, involving chemical structures and substructures, general and specific biological effects, and a variety of types of material. The number of sources, both printed and on line, of potential value in such searches is so great that keeping up to date with effective search techniques can be a problem for experienced users, and an impossibility for those less experienced. It is against this background that the need for some collaborative user action was agreed, and TIWP formed.

Two basic roles for TIWP have been seen from the outset. Firstly 'one-off' projects should be carried out by working party members, co-opting support as necessary. Secondly, and of at least equal importance, TIWP will act as a catalyst for on-going projects organized by other relevant bodies (AIOPI, UKOLUG, etc.)

TIWP aims to communicate with the user community via the AIOPI and UKOLUG newsletters, and personal notification to any other interested people, there is no restriction to members of the 'sponsoring' bodies.

ACTIVITIES

The primary activity of TIWP so far has been sifting through the suggestions made at the original meeting and subsequently, and initiating those which appear practicable at present. Some of these are described here.

One of the main points to emerge from the initial meeting was the need for a reliable, up-to-date guide to the many sources of chemical toxicology information. Working party members have therefore produced annotated lists of such sources, including reference books, printed abstracting and indexing services, and on line data-bases and data-banks. There will be made available to anyone interested, and will be updated as necessary.

Online searching in this area presents particular problems,² particularly in view of the complexity of search logic which may be required in the various data-bases. TIWP members have prepared 'hedges' or 'stored searches', i.e. standard lots of search terms for particular sorts of queries in appropriate data-bases. These will be made generally available, and if possible mounted by the system providers concerned, e.g. BLAISE.

TIWP is working with other interested bodies to arrange appropriate programmes of meetings in this area. Two aspects are of particular importance. Firstly, there must be adequate coverage of searching in this important area in introductory training sessions, such as those given by data-base suppliers, and those organized by groups such as AIOPI. Secondly, there is a particular need for in-depth advanced discussion sessions on specialized aspects; these could be tied in with the preparation of specialized guides to searching.

TIWP will endeavour to assist communication between users and providers of information resources in this area regarding possible new services and improvements in existing ones; where possible this will be done via established channels such as UKOLUG. Evaluation of potentially useful additional sources will be carried out; this has already been done for the NLM (National Library of Medicine) Toxicology Data Bank. User evaluation of services will also be encouraged and publicized.

A potentially valuable departure from previous practice would be some sharing of the work-load in the area among users doing a high volume of similar searches in non-confidential areas, e.g. laboratory hazards. This could take the form of collaborative current awareness, generally available search results, etc. Although there may be problems here, with copyright and liability for instance, TIWP will strongly encourage this sort of initiative, again via established channels if possible. The general problem of legal liability for correctness and completeness of information supplied in this area is also under consideration.

We believe that the activities of TIWP will bring about real benefits to users of chemical toxicology information. It is possible that this sort of approach could be valuable in other subject areas.

Membership. The members of the TIWP during this period were David Bawden (Pfizer), Richard Dean (Wellcome), Tony Neale (Glaxo), Derek Sanderson (Fisons Agrochemicals), and Irene Whittaker (ICI-CTL).

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The National Poisons Information Service

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Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

THE FUNCTION OF the National Poisons Information Service is to operate a round-the-clock telephone service to the medical profession to provide them with information on the acute toxicity of substances in common use, and to offer advice on treatment of the poisoned patient.

The need for such a service is indicated by the fact that poisoning accounts for over 120,000 hospital admissions per year in England and Wales. There is such an enormous number of drugs, household products and agricultural and industrial chemicals which may be implicated in these incidents that no single doctor can have a working knowledge of the poisonous effects and treatments of all of them.

In 1962 an official report on *Emergency treatment in hospital of acute poisoning* recommended that 'an information service should be set up with central arrangements for co-ordination'. As a result of this the Ministry of Health, in co-operation with Guy's Hospital and its medical school, established the National Poisons Information Service based in London with associated centres in Edinburgh, Cardiff, Belfast and, later, Dublin.

The London centre was originally situated at Guy's Hospital in the Department of Forensic Science, however it soon became obvious that there was a need not only for an information service, but also for a clinical laboratory to provide a toxicological assay service, so a small unit was built at New Cross Hospital (one of Guy's group). Thus the present Poisons Unit houses laboratories as well as the information service, and the library services both departments.

The director and deputy director of the Poisons Unit are both consultant clinical pharmacologists/toxicologists and are supported by one full-time medical registrar. Other 'honorary' junior medical staff, including overseas graduates, are also associated with the unit. Their number varies according to the research projects in progress. Each member of this medical team takes part in a rota to provide medical advice for the service and to maintain close links with the clinical departments in the Guy's group where poisoned patients are treated.

Organization

Originally the information service was manned by clerical staff during office hours while at the other times phone calls were received on the Intensive Care Unit at Guy's by medical students or nursing staff. But in 1977 the Unit was given funds to employ staff to operate the service from the Poisons Unit during the whole 24-hour period. There are now eight information officers, all graduates in biological sciences and some with qualifications or previous experience in information science. Seven of the information staff work a 24-hour rota; the eighth person works ordinary office hours, attempting to co-ordinate the team and liaise with the rest of the Unit.

Services

We are essentially an emergency service for busy doctors faced with the immediate problem of how to treat a patient, so nearly all our enquiries are received by telephone.

A typical enquiry takes the form, 'We have a 20-year-old woman who has come into casualty, and she has taken an overdose of paracetamol. Can you tell us what symptoms to look for and what treatment is needed?' Or, 'A mother has phoned up to say her 18-month-old child has drunk some medicated shampoo. Can you tell me if there is anything harmful in it?'

We make a brief record of each call on simple printed forms, including name and address of caller, agent involved and amount ingested, time since ingestion, age of the patient, symptoms and the treatment given so far. All these factors influence the answer given. The sheets are given chronological numbers and calls are written up in log book to form a permanent record from which we later prepare statistics.

In 1978 we received over 25,800 telephone enquiries, an average of more than seventy calls a day. These are mostly from hospitals; less than 10 per cent of our calls come from general practitioners. Inevitably a certain number of enquiries are received from non-medical people—dentists, pharmacists, factory health services, health visitors, fire, police and ambulance services, vets and members of the public. We endeavour to give appropriate answers to all enquiries although in the case of members of the public it may be little more than simply advising that the person should see a doctor.

There are three main reasons why our service is restricted to the medical profession

- No poisoned patient can be properly treated without being seen by a doctor, and in Britain most people are within easy reach of a doctor or hospital.
- Correct advice can only be given by the information service if we first receive an accurate medical assessment of the patient's condition and our information, in turn, requires interpretation by the doctor who will be able to adapt it according to the circumstances.
- The details of product composition entrusted to us by the manufacturers are confidential.

Our basic information source is the *Poisons Index*, with over 13,000 entries for household, medicinal and agricultural products, industrial chemicals, animals and plants, filed by product name in one alphabetical sequence. Where necessary there are multiple entries so that a drug would be listed, for example, under its approved name and in all its proprietary names. The index is contained in Kalamazoo Visible Binders, with a separate sheet for each product. Each entry gives brief details of symptoms and

treatment with indications of amounts which could be dangerous. Where possible there are notes of symptoms and outcomes of cases reported to us, with highest survived dose and minimum lethal dose. Bibliographic references are also included where these discuss treatments or document detailed case histories, although mostly our users want facts, given quickly and concisely, rather than references. There is also a description of the product and packaging, confidential details of percentage composition of the main active ingredients which could contribute to toxicity, and the manufacturer's name and address.

In practice only about 60 per cent of our enquiries are answered by reference to the index alone, for despite constant updating and additions it can never be truly comprehensive. We often need to refer to standard texts¹⁻³, and our files of case reports are also useful for quick reference when answering telephone enquiries. We often need to seek advice from our medical staff who are always on call. Sometimes we obtain information from other information services, e.g. company medical information services, or Hazchem; or enquirers may be advised to contact other information services directly—EMAS (Employment Medical Advisory Service) if the problem is one of occupational toxicity, or our regional drug information service for advice on the therapeutic use of drugs.

Data collections

Index entries are compiled from several sources by the information officers, and evaluated and authorized by the medical staff before inclusion on the index. Information on product composition and packaging is supplied by manufacturers and trade associations who willingly co-operate with us when assured that composition details are treated confidentially.

Reliable information on fatal dose, symptoms and treatment can only be obtained from reports of previous poisoning incidents, results of animal toxicity tests and LD₅₀ are of limited value in predicting symptoms of overdose in man. Much of the information in standard texts referred to earlier is based on published case histories and we use these a great deal along with the more recent journal literature. Obviously the best source of information on the effects and outcome of actual poisoning incidents is our own user population, so following up cases reported to us is an important function of the information service. In this way we can survey the extent and severity of acute poisoning with particular products and the efficacy of different treatment methods. Also it provides a feedback on the efficiency of our service, giving doctors the opportunity to comment on the usefulness of the advice they receive and giving us some indication of the success of the treatment we recommend.

Each information officer is responsible for monitoring a particular set of substances, e.g. a group of drugs, and selecting calls of special interest for follow-up. Within seven to fourteen days a letter enclosing a reply-paid envelope is sent to the enquirer, asking him to fill in a questionnaire or send a summary of symptoms, treatment and outcome of the case. The case histories are filed with relevant correspondence and literature references in alphabetical order by name of substance involved.

There are limitations to the data collected in this way. The quality of information varies, the questionnaires are often incompletely filled and information about symptoms

and their duration may be insufficient or conflict with that given at the time of the call. There is often no proof that the poison was actually present and in toxic quantities or that there was only one poison present.

Also our set of case histories is biased toward the more serious cases and unfamiliar poisons since a doctor will probably be able to deal with many common poisons without referring to the information service.

Recently we have attempted to overcome some of these limitations by carrying out a survey with the co-operation of Accident and Emergency Consultants from seven hospitals. For all cases of suspected analgesic overdose seen in these departments a questionnaire has been completed which asks far more questions about symptoms, treatment and complications of treatment than could be included in routine follow-ups.

Another important source of data for the information service is our own Poisons Unit Laboratory, as a large proportion of their work is the qualitative and quantitative assay of drugs in blood and urine of patients suspected of suffering from acute overdose. Information collected by the laboratory staff during telephone conversation with the clinician requesting the assay, and afterwards by follow-up letters, provides data on the symptoms and efficacy of treatment in cases where the presence of drug in the body has been proved and in many cases the amount of drug measured.

Both laboratory and medical staff are actively engaged in research and clinical work directed towards evaluation of methods of treatment of acute overdose and the measurement of drug levels in the blood of poisoned patients. All this information is collected primarily to feed back to the *Poisons Index*, to update and improve our advice on patient management.

However, the Poisons Unit is aware that it has an important role in keeping the medical profession up-to-date with current experience of poisoning and its treatment, so reports, papers and correspondence based on data generated by the Unit, including results of surveys by information officers, are published in widely read weekly medical journals. These describe and evaluate methods of treatment and alert doctors about drugs, household products, pesticides, etc. that are currently causing concern because of frequency and severity of incidents involving them. Research and teaching activities of unit staff also help to publicize the information service within the medical profession.

There is still plenty of scope to develop the service and our future plans include computerization of some of our records to facilitate production of statistics and analysis of the data collected by monitoring.

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National Poisons Information Service: Poisons Unit library provision

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Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

THE POISONS UNIT Library serves the Unit staff, which consists of a medical, scientific and information work force concerned with the diagnosis, management and prevention of poisoning. Over the last few years its function has extended to the provision of facilities for the staff and medical students of New Cross Hospital. This diversification has precipitated the acquisition of books and journals from a wider

TABLE 1. *Field structure of a record*

<i>Field name</i>	<i>Information content</i>
Author	All the authors of a paper with surname first, followed by initials and a comma blank sequence to separate the first author from subsequent author(s). eg SMITH J. A., OTHER A. N. The surname is defined as the last continuous string of characters
Title	The full title of the paper, in English to facilitate computerized textword searching.
Reference	The appropriate journal abbreviation taken from the List of Journals Indexed in <i>Index Medicus—Title Listing</i> , followed by the year in brackets, the volume number and inclusive page numbers eg BR MED J (1979) V 2,1-2
Publications	Publication details of all records not eligible for inclusion in the reference field, eg unpublished reports, drug company brochures, etc.
Accession No.	A six figure number denoting the filing order within the library.
Pharmacology Methodology Toxicology	These fields consist of the keywords or keyphrases used to produce the subject indexes
Note	Additional information, eg language of publication, type of publication (editorial, review, etc) and abbreviations indicating analytical technique used, eg GLC = Gas-Liquid Chromatography.

range of subjects, but the stock is still biased towards toxicology and pharmacology. The library staff consists, at the moment, of one qualified librarian.

The in-house data base

A major service provided by the library is the production and maintenance of an in-house computerized bibliographic data base. This system was introduced in 1973 to facilitate the centralized storage and retrieval of articles originally held in the personal reference collections of individual members of staff. As such, it reflects the interests of these people and has never been intended, or expected, to provide comprehensive coverage of all the literature concerning toxicology and related subjects.

Material for inclusion is selected by our staff from the journals held in the library, from the current awareness services to which we subscribe, eg *Current Contents—Life Sciences*, *Toxicology Abstracts*, *Excerpta Medica Section 30 (Pharmacology and Toxicology)*, *National Clearinghouse for Poison Control Centers Bulletin* (published by the US Department of Health, Education and Welfare), and on occasions from the output of commercial on-line data bases, such as Medline, Toxline and Chemical Abstracts.

The data base is constructed with the aid of a package called Famulus, which is made available to us at University College London Computer Centre. Each record held on the file consists of nine fields (Table 1). The indexing terms used are taken from our own hierarchically structured thesauri. The use of MeSH was considered, but we found that it did not cater for the depth of subject coverage that we require.

At present there are approximately 13,000 references held on this file, with the rate of addition being 2–3,000 citations per annum. From the information held on file several types of index are produced (Table 2). Of these, the author and subject indexes,

TABLE 2. *Summary of indexes produced*

Type of index		Contents
*Author		All records in alphabetical order of first author.
*Pharmacology	Subject Indexes	Alphabetical listing of records by keywords, including cross references. One record may appear in more than one subject index and under several different entries.
*Methodology		
*Toxicology		
*'Edit' Listing		Analogous to the author index, but also includes: (a) all keywords (b) field labels (c) 'edit' numbers, ie unique record numbers allocated by the computer.
*'Index' of all Authors		All the relevant information in the author, reference and note fields is given together with the edit listing number(s) of the appropriate record(s).
'Index' of Journal Abbreviations		
'Index' of Notes		
'Count' Listing of Title Vocabulary		Alphabetic list of the terms found in the title field; most useful for formulating search strategies.

* These indexes are output on to microfiche.

edit listing and list of authors are output onto microfiche. New editions of these indexes are scheduled for production annually, with printed supplements appearing at two-monthly intervals. Copies of the microfiche are supplied to the Poisons Centres at Dublin, Belfast, Edinburgh, Cardiff and Birmingham.

Provision of poisons and safety data

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Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

The problem

IT IS NOW universally recognized that although doctors and pharmacists need accurate objective information about the drugs they prescribe and dispense, an entirely satisfactory method of supplying it has not been found. This deficiency may have resulted in the inappropriate use of drugs and an unacceptable frequency of adverse reactions.

Information on drug safety may be obtained from a number of sources. These include Martindale's *Extra pharmacopoeia*, drug compendia such as the *Physician's desk reference (PDR)*, the *Association of British Pharmaceutical Industry's Data Sheet Compendium (ABPI)* and the *Monthly Index of Medical Specialities (MIMS)*, the pharmaceutical manufacturers, medical and scientific journals, secondary information sources or professional colleagues. The most useful secondary sources include de Haen's *Drugs in use*, *Index Medicus* and *Excerpta Medica* abstract publications and computerized systems such as Medline. However, the real requirement is for a concise, accurate and unbiased summary about each product to allow the prescriber to obtain optimal effects while minimizing harm. Although some of the sources quoted provide much of this essential information, none succeeds completely. A number of these sources need to be consulted before a concise summary can be obtained. This takes time, which is perhaps the most precious resource of health professionals. There is usually little of it to spare to carry out detailed searches and build up a useful information base on the wide range of products available to them. However, this is an essential task if doctors and pharmacists are to remain up to date in their prescribing and dispensing habits.

In order to help in this task, a number of drug information centres have been established in major institutions which have compiled, and continue to update, specific drug information. They are equipped to answer rapidly many of the questions that may arise from the health professionals.

A number of factors must be considered when compiling these data.

Accessibility of information sources

As we have already indicated, there are a number of drug information sources. Rarely are all of these available to the practising physician or pharmacist, and even

if they were, it is extremely unlikely that he would have the time to conduct an exhaustive search. A system which brings all the available data together is desirable.

Completeness of drug information sources

No drug information source can provide complete data on all available drugs. The *PDR* (in the USA) and *ABPI Data Sheet Compendium* and *MIMS* (in the UK) are probably the most accessible information sources in the clinical setting. However, they contain only information supplied by the manufacturer. The data may therefore be out of date when received by the user and frequently a more recently drafted package insert may have more current information.

Validity of information

Very few drug information sources make any significant attempt to evaluate the validity and accuracy of published information. It is often assumed that major journals that are well refereed consistently publish reliable data, but this is not always the case. A method of continual evaluation of the clinical literature must be an integral part of any system of improved drug information dissemination.

Currency of information

One of the main problems is the currency of information provided. Textbooks are invariably out of date when published. Abstracting and bibliographic sources have a built-in lag period from weeks to months. Although Medline and Current Contents provide reasonably current bibliographic information, unless the references quoted are available, these sources are of little practical use. Ringdoc, on the other hand, gives a detailed abstract of the references quoted.

Some solutions

The problems outlined highlight some of the deficiencies in the information sources available today. What is needed are methods of providing *rapid* access to *current* information. Ideally, such a system should be capable of answering specific patient-related questions arising in clinical practice.

It is here that the drug information centres are most valuable. They are staffed by information professionals with an interest in and awareness of current clinical problems and are in a prime position to fulfil these requirements.

The pharmaceutical manufacturer can help by providing these centres with basic information on his products to which only he has access. This information may act as a useful core to the more diffuse clinical data that are accrued during use of the drugs in hospital or general medicine. It is for this reason that the Wellcome Foundation has recently prepared and published *The Wellcome Overdosage Manual*. The manual contains basic information on all the products manufactured by the company, and normally available only on prescription in the UK, and has been designed specifically for poison and drug control centres not only in the UK but also overseas. This should ensure that most, if not all, of the important centres can give informed advice, when contacted about cases of overdosage involving Wellcome medical products, based on scientific data and medical experience.

It is interesting to note that, fairly recently, Herxheimer and Lionel¹, attempted to define the minimum information needs for prescribers, and the Wellcome *Manual* follows a similar pattern to that recommended.

The product data presented in the manual were taken from a number of sources, including those mentioned above, and, in addition, recourse was made to a number of privileged sources in order to provide data on toxicity, adverse reactions, treatment of overdosage and certain methods of chemical assay for the active ingredients contained in the products.

We should like to stress at this point that in order for the manufacturer to provide a comprehensive current information service on the safety aspects of his products, he needs feedback from medical practitioners, particularly on the incidence of adverse reactions and symptomatology and treatment of overdosage.

To this end the Wellcome Foundation Limited established a Group Adverse Reactions Register with the expressed aims of recording, storing and retrieving data on adverse reactions and overdosage. The centre has been active for a period of ten years and has built up a substantial data base that may be interrogated in response to specific questions relating to the safety of the Company's products. For the past two years we have attempted to pursue reports of adverse reactions more actively than previously.

Figure 1 shows how the various functional groups within the Wellcome organization concerned with adverse reaction reporting, interact with the consumer in the form of hospital and general practitioners and, to a lesser extent, pharmacists.

Since the Foundation operates globally, it is necessary to co-ordinate the collection of reports from medical departments in local operating companies, and it is the Group Adverse Reaction Registration Centre (GARRC) which fulfils this function. In each country where the company has a medical department, the medical adviser is requested to maintain a register of adverse events which come to his notice. This usually arises by direct contact of a member of the medical profession with the company or sometimes by contact made during routine calls by medical representatives. In some countries these representatives are supplied with pads of initial report forms, which they complete after each visit if any adverse event has been encountered by a doctor. These forms are returned to the medical department within the operating company and the details entered into a log book, which enables the progression of each individual case from initial notification to final transference to the GARRC to be monitored. Frequently the initial details are fairly sketchy and in order to obtain as much data as possible on the reaction, it is usually advisable to send to the doctor or pharmacist who made the complaint a post-paid adverse reaction form to complete.

This form is divided into four sections. The first relates to confidential information about the patient and the name of his general practitioner. Other sections relate to details of the product, adverse reaction and finally any additional background data that may be pertinent to the case. It is hoped that the details requested can be supplied by the doctor without extensive recourse to patient files. In addition, the form is self-carboned so that the doctor can retain a copy. All the data supplied in these forms are strictly confidential.

At the end of each six-month period, all the medical advisers are requested to send copies of their log sheets and any returned adverse reaction forms and relevant correspondence to the GARRC.

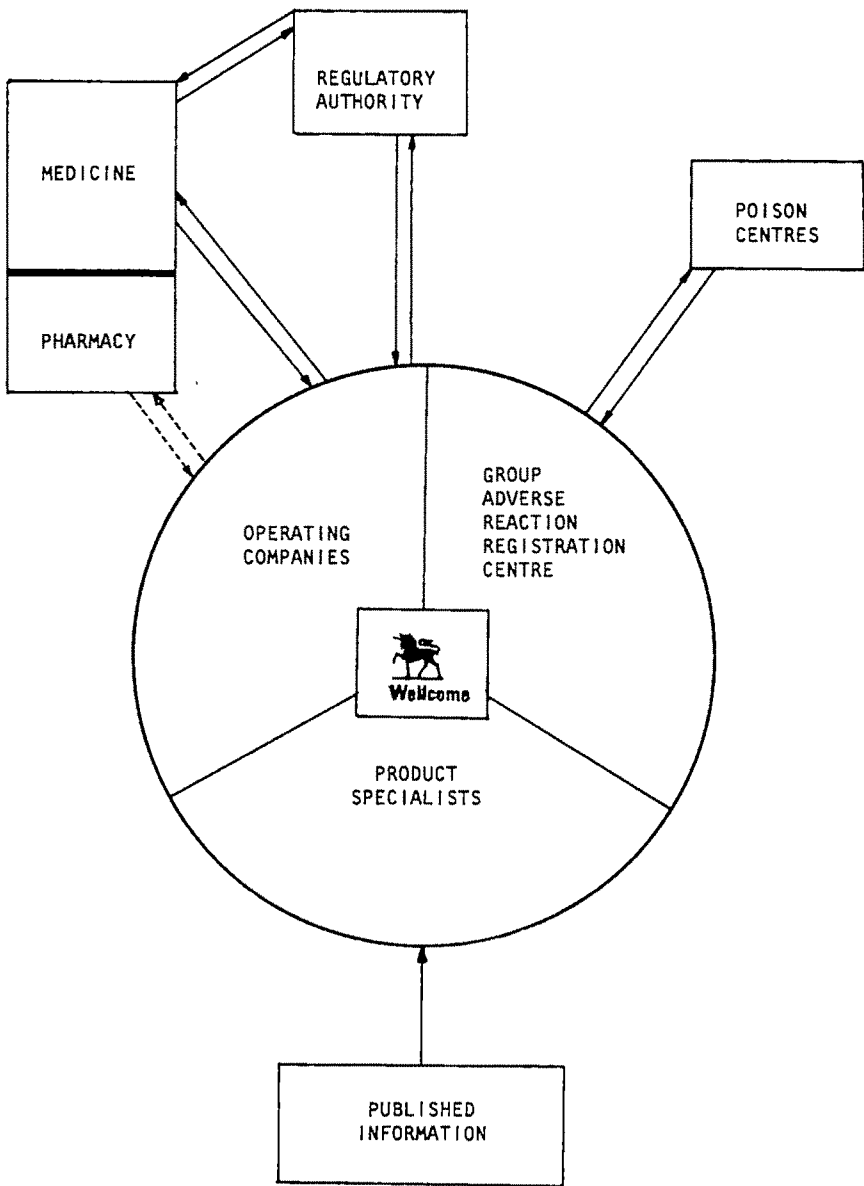


FIG 1. *Interaction between the Wellcome Foundation and other groups*

The data so collected are then passed to the specialist physician with product responsibility within the Clinical Research Division to make a medical appraisal as to whether the event as documented may be:

- probably drug related,
- possibly drug related,
- probably not drug related, or
- insufficient data to assess.

The completed case reports are then filed in the GARRC. The files are also monitored by a physician in the Clinical Research Division who is recognized as an expert in product surveillance.

It is the responsibility, in the UK at least, of the medical adviser to report the reaction to the Adverse Reaction sub-committee of the Committee on Safety of Medicines if it has not already been reported by the patient's physician. In this way the unnecessary duplication of reports is generally avoided.

When each six-monthly influx of data is filed, a confidential bulletin is produced which summarizes the information that the GARRC has received, not only from the operating companies but also from various regulatory authorities around the world. This is circulated to all medical advisers for their information. Only medically qualified personnel in the Wellcome Group receive this bulletin.

The other main source of information is the published literature and any relevant reports of adverse reactions are entered into the central data base. The importance of this source of information is borne out by the history of the oculomucocutaneous syndrome which followed Practolol therapy, which first came to light in the medical press. In addition, valuable data on adverse reactions are obtainable from the compendia produced by some of the National Regulatory Authorities, namely the UK, Australia, New Zealand, Canada and Scandinavia. These compendia tabulate adverse reaction data reported by medical practitioners to these regulatory authorities.

A punched card retrieval system was devised in the early days of the Centre, which had the merit of providing a rapid response to enquiries. This system is still in operation. The information recorded on the cards about each case is the sequential log number, the name of the drug, the adverse reaction, the sex and the age range of the patient, the country of origin of the report and an appraisal. Further information can be found by referring to the original reports completed by the doctor.

As the register continues to grow, there is a danger that the punched card system may become unwieldy and less effective for immediate retrieval. We have therefore transferred the data to a computer disc and use a commercially available software package (IBM STAIRS) to interrogate the files. It also permits us to store data on a number of other parameters, including race, disease being treated, concomitant therapy, etc., which are important if the adverse reaction is to be seen in context. This information is available on-line at a VDU terminal to enable us to interact freely with the data base, and it is possible to produce printouts of selected data, both routinely and on special request.

All reports of serious reactions are immediately examined by the medical product specialist who considers whether it is probable or possible for the reaction to be drug-related. Often there is insufficient data to make any valid assessment. When necessary, a site visit to the doctor making the report will be made by a Medical Adviser.

It is from the accumulated reports of adverse reactions received from doctors and pharmacists that we are able to prepare an accurate adverse reaction profile for each of our products.

A much simpler system is used to establish which of our products pose problems in overdosage and/or abuse. Again, a post-paid form is used, but this is completed and returned to us by the poison centres. This is a fairly recent innovation and it is hoped to build up a picture which can be reflected in future editions of the *Overdosage Manual*.

Other needs for information

We have dealt pretty extensively with the methods used by the Company to provide data to and retrieve it from the health professionals, but other sections of the population who should receive selected information are

patients taking the drugs,
individuals handling bulk supplies of raw materials, and
workers engaged in manufacturing the drugs.

Patient-oriented data

Hermann² has proposed that information be supplied to patients in lay-language to alert them of the need to complete courses of drug therapy, of possible side effects and adverse reactions, and of what to do in cases of accidental over-ingestion. This is something that all manufacturers of medicines, whether over-the-counter or ethical pharmaceuticals, may be required to do in the future.

Safety data sheets

The company is obliged by law to provide information on the basic toxicity and handling hazards for its raw materials, particularly in cases of accident, either in the factory during manufacture or in the environment during transportation of the raw material or finished products. To this end, the company is in the process of preparing 'Safety data sheets' on all of its raw materials and finished products to fulfil this legal obligation.

In summary, the pharmaceutical manufacturer has a responsibility to provide basic product safety information to those who need it. An attempt has been made by the Wellcome Foundation to provide much of this information by the production of an *Overdosage manual*. In addition, there is a legal requirement to monitor the safety of their products in general clinical usage and thus the Foundation is doing in the GARRC with the development of a computer-based adverse reaction data bank.

Finally, our efforts to identify problem drugs in relation to overdosage or abuse continue in liaison with poison and toxicology centres world-wide.

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Sources of information in radiological protection

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Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

IN THE CURRENT issue of the *Guinness Book of Records* there is a table categorizing chemical elements by their unique property—osmium as the most dense, hydrogen as the lightest, gold as the most ductile, tungsten having the highest melting point, etc. Plutonium is listed as the most poisonous and toxicity is therefore treated as an established fact, like density or ductility. But in this comparative use 'poisonous' needs defining to be meaningful. It may be necessary to identify a biological end-point and specify whether the poison is acute or chronic, whether the intake is by inhalation or ingestion and, for radioactive materials, whether the comparison should be expressed in terms of mass or activity.

In fact, if the relative toxicity per unit of mass of plutonium and other radionuclides is considered in terms of the most restrictive values for cancer induction (*i.e.* inhalation of soluble plutonium compounds), radium-224 is sixty four times as toxic as the most toxic plutonium isotope, plutonium-228; and thorium-228 is about thirty times as toxic; and plutonium-228 is itself about 265 times as toxic as plutonium-239.¹ Radium-224 and thorium-228 are decay products of thorium-232; they all occur in nature.

I quote these data to show that comparisons of radiotoxicity have to be made with care and also that they may well run counter to popular impressions. The variety of radionuclides (and their chemical and physical forms) in use in nuclear medicine and elsewhere, and present in nuclear installations (and in some cases their surrounds), means that radiotoxicity is complex; it is a matter of considerable research; and, particularly where the nuclear industry is involved, it is a subject of public debate.

Biological effects of radiation

The biological effects of radiation have been studied for over eighty years, not least because of their potential adverse effects on the health of those who work with radiation (but also for their diagnostic and therapeutic value). Because of the huge increase in the use of radioactive materials since 1945, especially in the nuclear industry, particular laboratories have become well established with large scale research programmes in radiobiology. They include, in America, the Argonne National Laboratory, Illinois; Inhalation Toxicology Research Institute, Lovelace Foundation, Albuquerque, New Mexico; Los Alamos Scientific Laboratory; University of Utah; Battelle Pacific Northwest Laboratory, Richland, Washington; and the Radiobiology Laboratory of

the University of California. In France the laboratories of the Commissariat à l'Energie Atomique at Fontenay-aux-Roses and in Germany the Karlsruhe nuclear research centre are well established. In the UK there is the Medical Research Council's Radiobiological Unit (RBU) at Harwell and the Clinical and Population Genetics Unit at Edinburgh; and, since 1970, the National Radiological Protection Board, which has its headquarters and main laboratories at Harwell.

Since the NRPB is both a user of, and a provider of, information in radiobiology you will find these and other sources of information listed in the references to some of its reports.

United Nations Scientific Committee on the Effects of Atomic Radiation

The major review of the biological effects of radiation is carried out by UNSCEAR, which publishes an authoritative and comprehensive report every few years on levels of radiation exposure and effects. The original concern of UNSCEAR was the level of exposure of the world's population from radioactive fallout but the interests of the Committee have broadened; the first general review appeared in 1958 and the most recent in 1977.² The latter deals with the physical and the dosimetric aspects of various radiation sources and with different types of biological effect; there is a general review followed by detailed studies—annexes—on concepts and quantities used in the assessment of human exposures; the doses resulting from natural sources; from contamination by nuclear explosions; from nuclear power production; from occupational exposure; and from medical irradiation. These are followed by annexes reviewing the available information and estimates of radiation carcinogenesis, the genetic effects of radiation, and the developmental effects of irradiation *in utero*.

BEIR Committee

Another major review³ is carried out by the BEIR Committee, a committee of the American National Academy of Sciences. The next report should be published soon. The BEIR reports have strongly influenced radiological protection in the USA.

Standards

The primary international body concerned with standards is the International Commission on Radiological Protection. The Members of the Commission are appointed every four years by the International Congress of Radiology. Both bodies are non-governmental. The Commission has been functioning since 1928, when it was first established as the International X-ray and Radium Protection Commission by the Congress, and it took its present name and organizational form in 1950.⁴ It makes recommendations relating to the fundamental principles on which radiation protection measures can be based and recommends a system of dose limitation, and methods of ascertaining dose, based on radiobiological knowledge and a consideration of statistical information relating to the incidence of disease and accidental death in various walks of life.

Membership of ICRP is based solely on the recognition of merit and experience in the relative fields of science and medicine. Those who serve on the Commission do so strictly in their personal capacities and represent no-one. The present Chairman of ICRP is a Swede, the Vice Chairman is an Argentinian, the Secretary is a Canadian.

The Commission has four standing Committees. the Chairmen are members of the Commission.

The Royal Commission on Environmental Pollution⁵ stated as one of its principal conclusions:

There is no better way of deriving basic standards than on ICRP recommendations, given that the scientific standing and independence of its members is maintained.

ICRP issue their recommendations in a series of publications known as the *Annals of ICRP*. In 1977, they published a revised version of their basic recommendations, applicable across the whole field of radiological protection, in Publication No.26⁶ (The previous version was published in 1965.) The present version has introduced little or no change in the more important basic dose limits but there are important changes in emphasis and in methods of estimating doses for protection purposes. These recommendations may be summarized as follows:

Justification: Every activity resulting in an exposure to ionizing radiation must be justified by the production of a positive net benefit

ALARA: All exposures shall be kept as low as reasonably achievable (ALARA), economic and social factors being taken into account.

Dose Equivalent Limits: An annual upper limit of 50 mSv* (5 rem) for a worker, and 5 mSv (0.5 rem) for a maximally exposed group of the general public, must not be exceeded.

ICRP makes recommendations. They are not binding on anyone. The Commission's authority derives from the fact that its recommendations are, as far as anyone can tell, almost universally accepted. However, it should be borne in mind that the words 'standards' and 'limits' are used in somewhat differing ways by different people. The federal agencies of the United States, for example, generally in matters concerning health and safety, issue what are commonly known as federal guidance or standards, e.g. for water. In radiation, these standards are taken by other federal agencies as effectively the upper limits to apply in such matters as licensing individual applications of radiation.

ALARA is vigorously applied by the regulatory authorities in both the UK and USA. When, however, because of the constitutional and industrial position in the United States, a federal agency publishes further guidance relating to the practical application of the principle for use by various state and federal authorities and mentions a particular dose level in relation to a particular application, this is sometimes mistaken by people of other countries to be a 'tightening' of a standard or a 'lowering' of the limit. This is not the case and it is generally true to say that the actual doses people receive in different countries for similar applications of ionizing radiation is much the same.

The NRPB has published two reports which consider this matter in greater detail.^{7,8}

* SI Units, the sievert (Sv) has replaced the rem as the unit of dose equivalent (see Table 1).

Limits

It is important to distinguish between the various types of limit used in ICRP terminology:

- the primary limits—the dose equivalent limits of 50 mSv (5 rem) per annum.
- secondary limits, for example, Annual Limits of Intake (ALI) by ingestion or inhalation of radionuclides. To calculate ALIs, the dose delivered to each organ for a given intake of each radionuclide is estimated; weighting factors are then used to calculate the ALI which would involve a harm commitment equal to that resulting from whole body irradiation of 50 mSv (5 rem)*.
- Derived Limits, that enable the primary and secondary limits to be complied with, for example by means of practical measurements in the environment of contamination of food, soils, surfaces etc. DLs are set with the intention that compliance with a Derived Limit ensures virtual certainty of compliance with the basic dose limits.
- authorised limits, often arrived at following the implementation of the 'as low as reasonably achievable' principle; they enable competent authorities to maintain effective control of radiation exposures and are generally below, and never exceed, the Derived Limits.

The influence of the ICRP philosophy is indicated by the final report of the Advisory Committee on Asbestos,⁹ which recommended a system of dose limitation based on justification, ALARA and a dose limit.

The following documents have also been published recently by ICRP:

Publication 27	<i>Problems Involved in Developing an Index of Harm</i>
Publication 28	<i>The Principles and General Procedures for Handling Emergency and Accidental Exposures of Workers</i>
Publication 29	<i>Radionuclide Release into the Environment: Assessment of Doses to Man</i>
Publication 30	<i>Limits for intakes of Radionuclides by Workers</i>
Publication 31	<i>Biological Effects of Inhaled Radionuclides</i>

ICRP publications are available from Pergamon Press, Oxford.

United Nations agencies

Although WHO, ILO and other UN agencies may be thought to have an interest in radiological protection, the main information source is the International Atomic Energy Agency in Vienna. Its major achievement is the regulations for the safe transport of radioactive materials. The Agency publishes safety series, conference proceedings, panel proceedings, technical reports, a monthly bulletin, a quarterly list of meetings, conferences, etc., and, of course, the indexing and abstracting service INIS, invaluable in radiological protection. The IAEA, WHO, NEA (see below) and ILO are now jointly reviewing their basic radiation safety standards in the light of ICRP Publication 26.

* This replaces the 'critical organ' concept by which a single organ was used to control exposures because it was 'of the greatest importance because of the dose that it receives, its sensitivity to radiation, or the importance to health of any damage that results'

Nuclear Energy Agency (OECD)

The Nuclear Energy Agency of the Organization for Economic Co-operation and Development is a particularly successful example of international co-operation in nuclear energy and related subjects including radiological protection. It comprises twenty-four developed countries, including the UK, and is generally concerned to promote principles which are subsequently incorporated into the administrative and legal systems of member states. In radiological protection, NEA publishes standards for consumer products, *Nuclear Law Bulletin* and proceedings of conferences that it has organized, e.g. on radioactive waste. NEA publications should be obtained direct from the Agency at 38, Boulevard Suchet, 75016 Paris.

European Communities

Strictly speaking, the EC is a 'supra-national' organization. It is important as a source of information because it has a substantial 'Biology/Health Protection Programme' and because it finances investigations of various kinds, and publishes the results. Sometimes these are in the form of reports, available free of charge, such as a recently published joint study by NRPB and the French Commissariat à l'Energie Atomique,¹⁰ and sometimes a commercial publisher is used, as for a recently published review of the toxicity of plutonium, americium and curium.¹¹

The Member States of the EC have also in hand a revised draft Directive on Radiological Protection; like the previous Directive, it will be binding in Member States as to its objectives, when the text is finally agreed. It contains recommendations based essentially on those of ICRP contained in Publication 26. The text of the Directive will be published in the Official Journal, as was the draft Directive and proposed amendments.

Miscellaneous sources overseas

The publications of the American National Council on Radiation Protection and Measurements (NCRP) are considered particularly valuable; they are available from NCRP Publications, PO Box 30175, Washington DC 20014, USA.

The International Commission on Radiation Units and Measurements (ICRU) is another source of specialist documents, they are available from ICRU Publication, PO Box 30165, Washington DC 20014, USA.

Information Sources in the UK

In the UK, radiation hazards are treated constitutionally as just another kind of risk, so that government organizations with responsibility for, say, protecting coastal waters from chemical pollution are also responsible—together with Department of the Environment—for protection against radioactive contamination from nuclear installations; and those legally responsible for enforcing health and safety at work include radiological protection as part of their functions.

The Sixth report of the Royal Commission on Environmental Pollution,⁵ the government's response¹² and the report of Mr Justice Parker on the Windscale Inquiry¹³ are documents of major importance.

As another instance, in support of its role, MAFF operates the Fisheries Radiobiological Laboratory at Lowestoft which publishes reports on radioactivity in surface and coastal waters of the British Isles; the most recent was that for 1977¹⁴

The Department of the Environment has recently introduced a new series of reports on radioactive discharges in Great Britain; the first was published earlier last year and covered 1977¹⁵ BNFL, UKAEA and CEGB also publish reports containing data on pollution by radionuclides.

The Department of the Environment is the ministry primarily responsible for 'solving the radioactive waste problem', although many other organizations are engaged in the research and development work. Recently, DoE published a major review of radioactive waste policy by a group of experts¹⁶ and it will shortly publish a review of research in this field.¹⁷

In due course the UK will be obliged to implement the EC Directive on Radiological Protection, mentioned earlier. As with other hazards in the workplace, there will eventually be a system of regulations, approved codes of practice and notes for guidance to replace the existing regulations and codes. HSE and NRPB are both involved with this. Consultative documents have already been published^{18,19} and NRPB has published its advice to the Commission on dose limits,²⁰ having earlier made general recommendations in relation to Publication 26²¹. There has been some confused public discussion on this subject and I strongly recommend that anyone interested should read the original documents with care.

The National Radiological Protection Board

The National Radiological Protection Board is a public authority created by the Radiological Protection Act, 1970, which came into effect on 1 October of that year and applies to the whole of the United Kingdom. The Government's purpose in proposing the legislation was to establish a national point of authoritative reference in radiological protection. The Statute gave the NRPB the following functions

- by means of research and otherwise, to advance the acquisition of knowledge about the protection of mankind from radiation hazards, and
- to provide information and advice to persons (including government departments) with responsibilities in the United Kingdom in relation to the protection from radiation hazards either of the community as a whole or particular sections of it.

The Act also empowered the NRPB to provide technical services to persons concerned with radiation hazards and to charge for those services.

The NRPB co-ordinates the National Arrangements for Incidents involving Radioactivity (NAIR) and helps to determine suitable standards of training for radiological safety officers and others responsible for radiological protection in the field, as well as arranging for the organization of suitable courses or other forms of training. Other NRPB functions include acting as agents of the Health and Safety Commission. The NRPB's work includes non-ionizing radiations (e.g., microwaves, lasers, ultraviolet and infra-red radiations).

The NRPB's research programme includes studies of deposition and clearance of radioactive materials from lungs, of metabolism and effects of incorporated radionuclides, of removal of incorporated radionuclides; of radioactivity in the environment;

and methods for the precise calculation of radiation dose. 'Provision of advice' includes advice to government organizations on standards and the NRPB also publishes the results of technical studies, e.g., in relation to disposal of radioactive waste. A description of the NRPB's system of publications is given below. I should like to stress, however, that NRPB publishes much of its information in the same way as other organizations working in science, in refereed journals.

The NRPB also has a library which covers the range of specialist library functions,²² and a slides library containing some 2,000 slides. It also provides an information service for the media and the general public.

NRPB system of publication

Except where otherwise stated, publications are available from HMSO.

Advice on Standards for Protection (ASP)

In August 1977 the NRPB was directed by the Health Ministers to advise the appropriate government departments and statutory bodies on the acceptability to the UK of standards for radiological protection recommended or proposed by international bodies, and on their application. The advice is formalized in this series of documents.

Emergency Reference Levels (ERLs)

The NRPB was also made responsible for specifying Emergency Reference Levels and for providing guidance to government departments and other appropriate bodies on the derivation of ERLs relating to radiation exposure and radioactive materials in the public environment. For this purpose a new series of documents has been established.

Publication in draft of advice or recommendations

The Board has decided to publish in draft form advice to those with responsibilities for radiological protection which involves issues relating to acceptability of risk, to enable interested parties to comment.

Technical reports

Over eighty of these have been published. They cover all aspects of radiological protection, including radiobiology, standards, miscellaneous sources, contamination of food chains, occupational health, nuclear power, new methods of dosimetry, risk estimates and an inventory of the radiation doses received by the public. Although many are specialized, there have been some of fairly general interest to the public and others which, although very technical, deal with matters of strong public interest, e.g., the consequences of notional accidents in fast reactors. An annual report on radioactive fallout is produced,²³ in future there will be reports dealing with fallout in diet, based on concentrations in milk, following the transfer of this work from the Agricultural Research Council's Letcombe Laboratory. A particularly important report, NRPB-R77,²⁴ reviewed radiation doses to the population of the UK from all sources; it concluded that on average the dose to the population of the UK was provided in the following proportions. 67.6 per cent from nature, 30.7 per cent from medical irradiation, 0.6 per cent from radioactive fallout, 0.5 per cent from miscellaneous sources, 0.4 per cent from occupational exposure, 0.15 per cent from the disposal of radioactive waste

Instrument evaluation reports

These give information on radiological protection instruments as tested by the Board.

Derived limits reports

These reports will provide values of derived limits for surface contamination in the workplace, the contamination of environmental materials, releases of radionuclides to atmosphere, etc.²⁵

Annual research and development reports

These describe the research projects carried out each year, in the fields of biology and physics.

Three-yearly reports on the work of the NRPB

There have been two of these, for the years 1970-73 and 1974-76. They are general reviews of the Board's work rather than detailed scientific communications and have been particularly well received.

Miscellaneous specialist booklets

Two have been published: *Protection against ultraviolet radiation in the workplace*, which outlines the biological effects of ultraviolet radiation and describes the measures that can be taken to protect people in places of work, and the *Code of practice for the display of sources of ionising radiations at exhibitions*, which concisely describes the minimum requirements of good practice for the avoidance of radiation hazards at exhibitions. Other booklets will be published from time to time.

Publications for the layman

One booklet, *Living with radiation*, has been published and has proved very successful. It explains the nature of ionizing radiations and radioactivity, describes some of the benefits and risks arising from their use and outlines the principal steps taken to protect the public and workers from these risks.

Joint publications with other organizations

Occasionally, the Board publishes jointly with other organizations, e.g., the Health and Safety Commission.¹⁹

Radiological Protection Bulletin

The *Bulletin* was first issued in October 1972. It aims to maintain a balance between policy, science and more detailed technical matters, and generally covers radiological protection in breadth rather than in depth. A substantial proportion of its circulation is overseas. The *Bulletin* is published every two months and is distributed, on subscription, by the Board.

Information sheets

From time to time the Board publishes information sheets, available free of charge from the Board's Information Officer, at Harwell. Some are of general interest, some specialized (e.g., *Criteria for safe working with iodine-125*)

Brochures

The Board publishes brochures describing the services it provides and the training courses it organizes.

In addition, studies carried out by NRPB for the CEC will generally be published by the Commission or by a commercial publisher on its behalf, as were the two already mentioned.^{10,11} Studies carried out by the NRPB for UK government bodies are generally published by the NRPB, as technical reports. (A complete list of Board publications is available from the Information Officer, NRPB, Harwell, Didcot, Oxon, OX11 0RQ.)

Conclusion

It is probably true to say that more is known about the effects of radiation and radioactive material on the body than any other potential hazard. Consequently, in radiological protection there is available a great volume of information ranging from radiobiology and studies of risk, through standards, to legislation and related documents. It includes numerous technical studies of radiation levels and effects, compilations of data, etc; and advice on protecting various groups of people and the public in general. The major sources of information have been described in this paper.

TABLE 1 *Relationships between the new International System of Units (SI), adopted by NRPB from 1 April 1978, and previous units*

Quantity	New named unit and symbol	In other SI units	Old special unit and symbol	Conversion factor
Exposure	—	C kg ⁻¹	röntgen (R)	1 C kg ⁻¹ ~ 3876 R
Absorbed dose	gray (Gy)	J kg ⁻¹	rad (rad)	1 Gy = 100 rad
Dose equivalent	sievert (Sv)	J kg ⁻¹	rem (rem)	1 Sv = 100 rem
Activity	becquerel (Bq)	s ⁻¹	curie (Ci)	1 Bq ~ 2.7 × 10 ⁻¹¹ Ci

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Reckitt & Colman poisons information system

Eric F. Engler

International Marketing Services Executive,
Reckitt & Colman Pharmaceutical Division

Paper presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

RECKITT & COLMAN LTD is a very large company with an extensive international operation. We manufacture literally hundreds of widely differing products which fall into the following main categories:

- foods
- wines
- household products
- toiletries
- pharmaceuticals (prescription, over-the-counter)
- creative leisure products
- industrial cleaning equipment, chemicals, cleaners
- pigments
- veterinary products.

Since so many of our products are widely used by the public, it is essential that, in parallel and in co-operation with the UK poisons information centres, we have our own in-house system for dealing with emergency calls on misuse, abuse or accidents with these products. On average, we receive some 100 emergency calls per annum.

The overall responsibility for operating the system is with the Pharmaceutical Division's Medical Department, on behalf of the Group.

The main objective of the system is to provide a rapid and efficient answering service on a twenty-four hours a day, 365 days a year basis, and to this end we have produced a 'First Aid Bible'. The system needs to be both simple and semi-automatic to operate well.

Dissemination of basic data

Detailed formulae of new products and amended formulae of existing products are received by the Medical Department on an *ad hoc* basis. Each month, this information, suitably re-worked, is distributed to poisons information centres in the UK, to key personnel in the Group and to a dozen or so prime contacts, who are responsible for dealing with after-hours calls.

With each monthly set of amendments there is a covering sheet, listing each amendment, with instructions as to where it should go in the 'Bible'. A duplicate set

of acknowledgement forms is also sent out, one of which is retained by the recipient, the other is returned to the Medical Department, and serves as a check that the information has arrived safely.

A master 'Bible' is located in the Medical Department.

How the 'Bible' is used

The 'Bible' is divided into a number of sections:

Standard operating procedures for telephone operators, security staff, and within-hours and after-hours contacts. Within-hours contacts are sited in the Medical Department. Detailed step-by-step instructions are given to minimize the risk of a call going astray. Any incoming emergency call is immediately routed to the Medical Department via a 'red phone'. This is always manned, and is used for this one purpose *only*. Details of call are taken down on a special form; a resumé of advice given is added, and whenever appropriate, the incident is followed up to ascertain the outcome. The form we use acts as a check list so that as much information as possible is elicited and recorded.

Prime contacts; Index of products An alphabetical index of all products gives page reference for each product in the 'Bible', together with the name and telephone number of the appropriate contact. A list of prime contacts, with their telephone numbers (home) is appended. When a call is received anywhere in the company after hours, telephone operators or security staff route the call to that contact. There are at least two prime contacts for each product, and in the event of neither of these being available, any other prime contact on the list may be called. Doctors who call may also be advised of the nearest poisons centre.

Poison centres; First aid. These two sections list the poisons information centres in the UK with their telephone numbers, and basic data on general first aid measures.

Product monographs. These are divided into sections relating to particular Divisions. The monographs include details of

- brand name
- unique reference number
- description of product type. e.g. solid, aerosol, tablet, liquid, etc.
- purpose of product. e.g. shoe cleaner, hairspray, analgesic, toothpaste, etc.
- size of container: no. or tablets, weight, ml., fl. oz., etc.
- main ingredients together with percentage content
- other ingredients
- any information on potential toxicity, LD50, etc.
- recommended treatment for ingestion, eyes, skin, inhalation, etc.
- date of issue of monograph
- whether new product, amendment, etc.

Glossary of brand names. At the back of the 'Bible' there is a comprehensive glossary of brand names of chemicals, used in our formulations giving their chemical description, e.g.

Hercules P702: phenolic resin;

Kahl VP 342/1: wax;

Schenectady SR 88: rosin maleate resin.

This index too, is regularly updated.

This Poisons Information System works satisfactorily in our organization, and we again stress that we work closely with the poisons information centres, particularly the New Cross Hospital Unit. We believe it is a flexible system, which could be adapted to suit any organization irrespective of size or complexity.

A list of organizations which contributed to the display with notes on their services (*) and on the material displayed

Display presented at the Aslib Biological and Agricultural Sciences Group Meeting, Aslib, London, 13 November 1979

British Industrial Biological Research Association

Woodmansterne Road, Carshalton, Surrey SM5 4DS

Annual report; journal, information bulletin; booklets, *information and consultancy service.

Chemical Industries Association Ltd.

Alembic House, 93 Albert Embankment, London SE1 7TU

List of publications, report; handbooks; booklets, leaflets; periodicals; posters (included Chemsafe manual; Labelling chemicals, Transport of hazardous loads; Health and Safety, Code of Practice).

EEC/Environmental Chemical Data Information Network (ECDIN)

UK Contact: Mr J. D. Bletchley, 1 Miles Close, Aylesbury, Bucks HP21 7JH

Information sheet, *data bank and network of centres of information (intended to be accessible through EURONET when fully operational)

Health Education Council

78 New Oxford Street, London WC1A 1AH

Annual report; leaflets; resource centre; *information services.

Health and Safety Executive

Employment Medical Advisory Service, Department of Employment, Baynards House, Chepstow Place, London W2

List of publications, booklists; reports, booklets; leaflets; posters; bibliography series; film catalogue; guidance notes; *area office information services.

Institute of Biology

41 Queen's Gate, London SW7 5HU

Publication: *Monitoring the marine environment: the biological implications of an expanded nuclear power programme*; *advisory group jointly with Council of Biology is being established to consider a skeleton code of practice for safety in biological laboratories, and to establish liaison with Health and Safety Executive.

Institute for the Study of Drug Dependence

Kingsbury House, 3 Blackburn Road, London NW6 1XA

Accessions list, United Kingdom current awareness bulletin; drug link (and supplement); information letter; *ISDD, information service; selected reference lists, list of offprints.

Laboratory of the Government Chemist

Cornwall House, Stamford Street, London SE1 9NQ

Annual report; leaflets, *Agricultural Materials Analysis Information Service (AM AIS); Consumer Hazards Analysis Information Service (CHAIS); Dangerous Goods Advisory Service (DAGAS); Oil Spillage and Identification Service (OSAIS).

Ministry of Agriculture, Fisheries and Food

Main Library: 3 Whitehall Place, London SW1

Catalogue MAFF publications; HMSO sectional list: agriculture and food; reports; booklets; leaflets; press notices.

Directorate of Fisheries Research, Lowestoft.

Fisheries research technical reports; laboratory leaflets; fisheries radiobiological laboratory technical reports; shellfish information leaflets (topics include field assessment of effects of dumping wastes at sea; radio-activity in surface and coastal waters; shellfish poisoning, etc.).

Monitoring and Assessment Research Centre

Chelsea College, University of London, 459A Fulham Road, London SW10 0QX
Publications list; reports.

National Radiological Protection Board

Harwell, Didcot, Oxfordshire OX11 0RQ

*Information services; annual report; reports; booklets; publications lists; press releases.

North East London Polytechnic

Maryland House, Manbey Park Road, London E15

Bibliography (Library Occasional Paper no. 5) (covers health and safety at work; laboratory safety; biological, chemical, electrical, fire, laser, radiation hazards, etc.)

Reckitt and Colman Group Ltd

Library and Information Service, Dansom Lane, Hull HU8 7DS

'First Aid Bible', unpublished reference tool used as a basis for their *information service

Royal Society of Health

13 Grosvenor Place, London SW1X 7EN

Publications; journal.

Science Reference Library

Bayswater Branch, 10 Porchester Gardens, Queensway, London W2 4DE

Publications; *services and facilities.

United Kingdom Chemical Information Service

The University, Nottingham NG7 2RD

Brochures; CA Selects, e.g. Drug and cosmetic toxicity, Food toxicity; Chemical Hazards Abstracts (on microfiche); *an experimental fortnightly current-awareness service, *Toxline/Toxback/Chemline and information services in the field of toxicology and related subjects.

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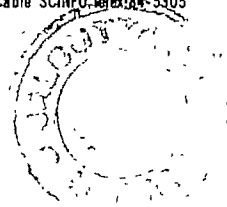
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Informing the citizen: a wide ranging provision to meet a wide ranging need

Alan Peacock

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I start this talk with two acknowledgements; the first, to my colleagues on the recent Library Association Working Party on Community Information Services. Our report is due to be published by the LA in the new year and I have based a lot of this talk on our conclusions. Secondly I must acknowledge many discussions with Alex Wilson, Director of Libraries for Cheshire, and the freedom that he has given me to pursue ideas in this field.

When I looked at the programme for today I began to feel like a 'fall guy'. Here, sandwiched between papers on real community needs, urban deprivation and rapidly arriving new technologies was the dear old middle class oriented public library which might be just about to miss the latest boat. I was also very conscious of a background of local authority budget costs, the need to justify services and current government attitudes on free public libraries. The Association of County Councils for example is pressing strongly for public library charges.

A further line of thought was provided by a very perceptive article in the *Journal of Librarianship* earlier this year by Wilfred Ashworth. He advocated that libraries in general should do only those things that they could do well. In reference to public libraries he instanced the wide range of services available, for example hobbies, personal interests, commerce, industry, education, recreation, on-line retrieval services, teletext, housebound readers' services etc. etc. Ashworth's thesis was that in a time of limited resources the public library must decide which of these services gives best value to the community and concentrate on them. This he described as his *future perfect library*.

Whilst I would agree with Professor Ashworth that libraries should concentrate on what they are good at I would also point out that in Cheshire we see all of these activities as part of a total service to the whole community. The trick is to maintain a steadily growing base line which can expand in better times.

I hope to demonstrate this morning, my firm belief in the public library service as a vital component of modern society that rather than being swamped by new ideas should in fact actively promote these ideas for the benefit of the whole community. I would prefer to call Professor Ashworth's *future perfect* my *future positive*.

The first step in this direction is to look at the needs of the man in the street. So far we have looked at the very real problems of social welfare, deprivation etc. and discussed services and the problems of access to information. We have seen in particular the fact that many people 'do not know what they do not know', and in consequence are bewildered about where to start to find information. We have also concentrated on community information services that tend to serve what is often

referred to, in that awful pseudo-jargon that we live with today, as the lower socio-economic groups of the population.

I would say, however, that there are far more people in search of information than this limited view. The man in the street also seeks help on recreation, education, sports, hobbies, tourism, local history etc. Deprivation is also not confined to an urban situation. Rural deprivation is a very real thing; it manifests itself in the loss of bus routes, village shop closures and the destruction of communities that can emanate from the loss of a village school. A personal example of rural deprivation is occurring today because my car is parked at Crewe Station and my wife has no other means of transport with which to leave our village, either to shop or to visit the doctor or the health clinic.

You will also notice that my list of needs for general information coincides neatly with Professor Ashworth's list of public library activities. Indeed the Public Libraries Act 1964 states that libraries should provide, leisure, education and information. I would submit that we have been very good at providing the first two but a bit reticent about the vast stores of information that we hold. Several recent reports, such as the National Council for Social Services *'The Right to know'* and the Community Projects Foundation, *'Libraries are ours'* have pointed to this hidden wealth. In Cheshire, as I will outline later, we have gone a long way in providing the information sources for the whole community; the original motto or slogan for our Cheshire Information Service, which includes public libraries, was in fact 'a place to go when you don't know where to go.'

Now I shall turn to what the public library has to offer in the way of community information services and how it should make itself available to the public. I do not wish to be seen as decrying the traditional reference provision which has given us the good basic stocks of today; what I want to see is a re-emphasis on public information services and more active promotion of existing reference services. This may entail management decisions to switch resources from book lending activities to information services, but I think that this is essential to fund a worthwhile and credible response to community needs. It is up to the public library to find its place in the information market place—to provide choice and an independent information source.

There are various graduations of Community Information Services that range in increasing degree of involvement through the following options:

- 1 Signposting the way to other information sources.
- 2 Referral directly to the correct department or authority by the information centre on behalf of its enquirer.
- 3 Advice giving on courses of action, form compilation etc.
- 4 Advocacy at tribunals as in the United States.

However, areas 3 & 4 are fields into which the public library should not lightly stray. Librarians are not trained to give advice and there are many legal and political implications, as well as the attitude of one's own authority, to be considered.

Perhaps the best approach for the public librarian is to ensure that he offers the best local information services possible within his budget and then seeks to provide active support to those organisations who can provide actual help and advice directly to clients. It has already been noted that the majority of library users come from the middle classes and probably the 'deprived' will not use any direct public library service anyway.

The public library has a number of assets that it could make available to support such organisations and these include

1 Access

The Library is often in a central place in a town, it has a network of branches which is particularly large in a County system and which is usually widened further by mobile libraries and village centres. There are problems of stopping times with mobiles but the Rural Community Council is sponsoring a series of village link schemes in various parts of the country whereby they provide information packs and support to an appointed contact in each village. This includes the use of mobiles and village centres in some cases.

The library has premises and can offer to share some of its accommodation with advice agencies such as CABx and consumer advice workers. There are examples of this throughout the country, but I would refer you to the very successful experiment at Bretton Branch library in Peterborough where advice workers have a desk in the library. Displays of Job Centre information is another way of using library premises.

2 Resources

The library has vast stocks of information, books, periodicals, government publications etc. which could often be loaned as deposit collections to small organisations. The knowledge of sources of supply and means of acquisition of leaflets, pamphlets, etc. which the library has, can be used to help organisations gather relevant publications. Secretarial help, typing facilities, duplicating services can also be made available.

3 Information handling skills

It should not be overlooked that librarians possess considerable skills in the handling and organisation of information. Cataloguing, classifying, indexing, bulletins production etc. are all techniques which many small organisations lack and which the local library could supply. Compilation and updating of local directories for example is a job that both sides could usefully cooperate on.

4 Self-help collections

The public library can do much within its stock arrangements to provide a community information area, bringing together items from across the classification in major areas such as Education, Health, Welfare etc. If these areas are suitably well presented and easy to use it should encourage self-help usage on the part of library clients, which is in keeping with several research findings that show that the majority of users prefer to look for things themselves. Personally, I avoid shops where one is instantly pounced on by an assistant enquiring 'can I help you, Sir?'

5 Leadership and Coordination

Libraries are often regarded by the public as impartial and neutral. This can lead the library into the role of leader or coordinator of local cooperatives of information providers and can be invaluable to clients and the organisations involved.

I think I have shown that there are a number of ways in which the Public Library can actively support community information and advice centres without attempting

to set up rival centres. In this way it should be possible to dip into the water without being drowned, and to be faithful to Ashworth's 'libraries should stick to what they are good at'.

Charging

I feel that I must just mention the problem of charging for information at this point, since the development of community information services using computers, for example with PRESTEL, does raise new challenges for the concept of the traditionally 'free' public library.

At a recent British Library workshop on online information services, the view was put forward that there was a feeling of a growing inevitability on the question of charges in the public library service. This feeling is growing with the advent of on-line with its £1 a minute connect times and PRESTEL with its charges per frame. The telephone bills and search invoices are very expensive and very visible to Treasurers, etc. There is also a move towards a new breed of information broker, and some databases such as New York Times are considering becoming exclusive to those prepared to pay a \$3,000 annual subscription. All of this is in direct contrast to the ethic of the free public library, but in these days of cuts and scrutiny there are many who are looking closely at the cost of information provision. Either way, who does pay the bills? There are no free meals!

And so leaving you with that thought I will move on to the ways in which public libraries are meeting these challenges. I will concentrate on activities in my own county but I must refer to the very successful service recently set up at Longsight Branch in Manchester. This library now has a full community information service including advice services, job centre displays and a full-time community librarian.

Another successful service has been established in Bretton Branch library, Peterborough, which features self-help collections and provides accommodation for a number of advice giving bodies, such as the Citizens Advice Bureau, Consumer advice etc. There is also a very active cooperative information providers group based on the library service's initiatives. Other services are also beginning throughout the country, and a number of research projects have reported on community information including the recent Library Association project that I referred to earlier. Our report is due out early next year and gives guidelines to authorities who wish to begin such services.

I shall now describe the Cheshire Information Service which has been developed since local government reorganisation in 1974. The service was set up because a number of the newly appointed District Council Chief Executives felt a need to inform residents of the facilities of their new boroughs and also to publicize the new authority to the outside world. In some towns in Cheshire all vestiges of local government were removed overnight on 1st April 1974 and the new centre of administration was set up some miles away. Middleswich is an example of this, the Town Hall was moved to Sandbach, six miles away, leaving a vacuum of local government services in the town.

These thoughts led the Chief Executives to consider ways of filling the gap and at this point Alex Wilson, Director of Libraries for Cheshire, suggested that the library service could provide accommodation, information skills, acquisition and coordination of material, etc. The result was a rapidly convened working party which set out proposals for a service to be run and financed jointly by the County and

District Councils. It was agreed that the Districts would be responsible for day to day management, staffing and local accommodation and that the County would be responsible for coordination, acquisition of material, distribution and training. The motto for the new service was to be 'a place to go when you don't know where to go'.

The service was launched on April 1st 1974 with 12 centres in operation, full information packs distributed and one training course completed. Rapid growth followed and within a year the present network of 17 District Information Centres and 55 libraries, serviced by a central distribution operation, had been established.

There are now some 70 points in Cheshire to which a member of the public can go to seek information; District centres are accommodated in council offices, high street shops, purpose built offices and originally there were three in public libraries which have subsequently been withdrawn as district council sites became available.

Enquiries for the first year totalled 168,000 and they have steadily risen to 400,000 in 1979. Two thirds of the enquiries relate to local government, but the subject range is very wide and often very similar to normal public library enquiries.

Examples include the first enquiry at one of the new centres, a man walked in and put his feet on the table and asked for directions to a chiroprapist. We have been asked to find a hypnotist and a painter for jugs on canal barges. A recent survey of all households in one district revealed that most seekers of information use libraries and Town Halls roughly equally as a first resort and information centres a close second.

The County Library's role is to provide coordination, training schemes and a central servicing unit that collects pamphlets, leaflets, and information in bulk and then redistributes it to the centres and libraries. The unit arranges standing orders with Government departments, statutory bodies, public utilities, health authorities, voluntary organisations, for all publications and handouts etc. to be supplied in bulk, for example 5,000 copies. In return we can offer the organisation public distribution and display of its publicity in some 70 places in Cheshire.

The servicing unit compiles information packs and indexing systems, it precodes material for easy filing and provides small basic reference collections for the centres. It also provides reference and enquiry back-up services for the centres and referral to other information suppliers. Other functions include the organisation of an Association of Information Centre Managers, provision of secretarial help, regular visits to libraries and centres and the compilation of a monthly news-sheet.

And so to sum up the present position; we have a network of 70 centres in convenient locations answering a wide range of enquiries. Public use has grown accordingly and the District and County Council departments regard them as useful outlets for publicity, such as the recent Structure Plan exhibitions. They have also been used to receive consumer complaints. Eight centres have been appointed as tourist centres and several hold regular surgeries for Councillors and local MPs.

Throughout the history of the service we have adhered firmly to the rule that the centres provide only information and not advice—sticking again to what libraries can do best.

I want to finish with some indication of our future plans in Cheshire. We feel that with the existing Cheshire Information Service running at 400,000 enquiries per annum and a similar figure of 400,000 enquiries in reference libraries, obtained in 1975, that

there is a very definite market for information in all walks of life. Libraries have always provided information but what is needed now is more publicity and promotion; a definite and deliberate switch of resources from book lending to information provision.

In 1978 a colleague and I looked in detail at our existing services and reported that Cheshire now had a basic infrastructure of information points, and coverage of most types of information was available in the County. Our report suggested a need to further coordinate all reference and information services around a small Central Information Unit whose purpose would be to provide backup services, information skills and communications for the whole network.

The report was approved by the Senior Management Team and implementation began in 1979. By happy chance, in 1978, Cheshire County had launched a drive to encourage firms to move into Cheshire and in particular the aim was to encourage small firms to set up. The libraries department was able to obtain some of this funding for the provision of on-line information services and a full commercial and technical service to industry.

We were thus able to fund the setting up of the new unit in Ellesmere Port reference library which is situated in the middle of the industrial belt of Cheshire. The service is staffed by three professional information officers who, with clerical support, aim to service the wider network of libraries and information centres on the circumference of the wheel of which the unit forms the hub. The basic aim of the Cheshire Information Service is that any member of staff at any service point will be able to pick up any type of query and if it cannot be answered locally, pass it onto the centre in the safe knowledge that the client will receive a timely reply. Each branch and information centre represents an entry point into the system.

In order to positively market the new service we have devised five separate but linked products. These are as follows:

- 1 Services to industry and commerce
- 2 The existing Cheshire Information Service providing community information
- 3 Public reference libraries—concentrating on the four largest service points because current economies are forcing us to reduce branch reference stocks to a minimum.
- 4 A new consumer-oriented information service providing road tests, tourist and holiday information, do-it-yourself and hobby information.
- 5 The existing Local Government Information Service.

Each of these products has its own 'manager', resources, policy, and market plan. We will market each product individually, or collectively as the Cheshire Information Service.

Cheshire has also invested heavily in the new information technologies such as teletext, on-line and the STAIRS information retrieval system and is looking at facsimile transmission and PRESTEL; that is if the GPO ever get it beyond Birmingham! However, I am reliably informed that PRESTEL services will begin in the North West at Easter 1980 and this should be a great step forward for us, because we want to use it to output community information from the central unit direct to library branches and information centres. This could save us time and money in distribution, indexing, and presentation.

In conclusion I hope that I have demonstrated that the public library has a positive role to play in the future; perhaps because of, rather than in spite of, the new technologies. We can remain providers of impartial, accurate and free information for the citizen using our wide networks of local delivery points. We can and should use our skills and resources to back advice centres, community workers etc. as long as we do not try to compete with them. Libraries should do what they can do best. We are told that we are into the Post-Industrial Society—based on knowledge. Indeed I think the figure of 50 per cent has been quoted for the information industry's share of the US economy. And so my final message to public librarians is Go out and make a place in the scheme of things to come—make your *future positive!* If you remain as lending shops you will wither and die, perhaps before the turn of the century.

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Will information flow to the citizen be improved with videotex systems?

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My first reaction to the word 'citizen' is an image of masses of people storming the Bastille. Apparently this image is not all that absurd since the new Collins dictionary says that the word is derived from the old French 'Citeien'. Collins goes on to define Citizen in several ways. For the purposes of this paper I choose 'A native or inhabitant of any place'.

Before considering the impact of the new technology it is as well to consider what kind of information the majority of citizens want, how well their needs are currently met, and what ability they have to pay for it.

To find out I chose one of several places I might have tried in the town where I work (Uxbridge, Middlesex)—the housing and consumer advice centre. 25,000 enquiries about housing and 16,000 enquiries about consumer affairs are handled annually at this centre. People from all social groups call here, although disadvantaged people dominate in one area—court cases, and in this area debt problems predominate. Since it is well known that many people go to the doctor looking for a shoulder to cry on and not for medical reasons, I asked the very helpful person at the centre how many of the enquiries she received were really of this kind. She replied (without a second thought) that many were.

Next I went to the reference desk at the local library and asked what kind of questions were asked there and by what kind of people. The first answer was unexpected, most questions are posed by people who cannot find an address in the town! Next are questions about legal affairs and welfare. Only about 10 per cent of the enquirers are disadvantaged people—the remainder are middle class.

All of this information is supplied free in a face-to-face discussion. At the centre, demand far outstrips supply—it is understaffed. The demand is for information about *living*; that is the area into which the local authority puts its information-supply money. If Uxbridge is typical, it is rather clear where the requirements of Mr and Mrs Citizen mainly lie.

We all know that particular citizens want specialised information, often connected with their occupation. The more specialised it is and the greater the need, the more likely is it that people will be prepared to pay for it. Perhaps stockbrokers would head a list of such people. What we do not know is how many citizens would be prepared to pay for the information they receive free at present, whether the New Technology, harnessed in some way, could do it better, how much it is going to cost and who is going to pay.

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At this point I must quote a piece from the Daily Telegraph.¹ It is about 'the world's most advanced hospital in Riyadh' and continues

'The cost of research and development makes it vital for firms to sell their hardware . . . the pouring of more and more money into the project has not made it a better hospital . . . it is like putting diamonds into a high quality Swiss watch; it makes it more expensive but it doesn't make a better watch'.

In short, technology-push has triumphed over demand-pull. Could the same situation arise in the area I am supposed to be discussing much as it did with computers in the sixties or is the demand for citizen's information much more price sensitive?

Information differs from many other commodities by reason of its intangibility, but I will attempt to guess how much money a citizen is likely to have available for new technology information systems; this should give some indication of the demand. Note that I am not talking about obtaining information for free by the subsidisation of either direct or indirect use

TABLE 1. DISTRIBUTION OF INCOMES AFTER TAX '75-'76 (FROM 'SOCIAL TRENDS' No. 8, 1977 HMSO)

Lower Limit of Range £	Number of 'Tax Units'*	% (Cum)	
		Bottom Up	Top Down
Under 1000	10,576 (000)	100.00	37.40
1-2000	10,828	62.60	75.70
2-3000	5,671	24.30	95.60
3-5000	943	4.20	99.10
5-10,000	248	0.90	99.97
10-20,000+	8	0.028	100.000
	28,274 (000)		
	*Married Couple or single person		

Table 1² shows the number of people having a given income available after tax. These latest available figures are rather old, and many people will now have moved into a higher income bracket; however the drop in the purchasing power of money offsets the age of the data so the figures may not be wildly out today in real terms. Note that 75.7 per cent of the 'tax units' (which I will call citizens from now on, although that is not quite accurate) received £2,000 or less after tax. I do not believe that many citizens in this group will have disposable income available for new technology information systems even assuming that today they are receiving £3,000. Moreover the new systems would need to be very cost-effective if any of these citizens replaced existing information sources—likely to be a newspaper and a magazine

subscription—with some new system. This does not necessarily mean that such systems will not be in wide use. Even if the above group is excluded completely, that still leaves 24.3 per cent or nearly 7 million people remaining. In the group receiving more than £5,000 or say £6,500 today who probably could afford some kind of system, there are 774,000 people.

Switching to another viewpoint, what has educational level got to do with the propensity to acquire information? For some information the question is inappropriate—for instance information about living. However, a so-called 'educated' person is more likely to be able to utilise some kinds of information more than someone less fortunate. If examination results tell us something about educational levels then Table 2 is of interest.⁸ Presumably the 12.8 per cent of UK school leavers who obtained 2 or more A levels were mainly drawn from the 26.9 per cent who got 3 or more O levels. If that be so probably at least 70 per cent of leavers are, by these criteria, relatively ill-educated. Is it pure coincidence that this number roughly corresponds to the percentage whose income is £2,000 or less after tax? This may reinforce the idea that the majority will not be in the market for new technology information systems. On the other hand you may take the more cynical viewpoint that it is not what you know but whom you know that matters, and there is little correlation between income and educational attainments.

TABLE 2 'O' & 'A' LEVEL EXAMINATIONS 75-76

Category	Number of People	%
All leavers	707,440	100
3 or more 'O' levels, grades A-C	190,300	26.9
2 or more 'A' levels	90,550	12.8

Sam Goldwyn said 'It is difficult to make forecasts, especially about the future' but the time has come to try. A very important factor in new technology systems is that for prices to become low, usage must be large enough to recover development, capital, and file creation costs as well as running costs—a 'chicken and egg' situation. This stalemate can be broken either by an initial 'Act of Faith' investment or by the introduction of a high-priced system aimed at people able to pay; at some point, if the entrepreneur's forecast is right, he can start to reduce the price in order to increase demand and enlarge sales. Both of these mechanisms could operate and eventually the price could drop to a level at which our average citizen could enter the market. I am now in sight of discussing the subject which appears in the title of this paper—Videotex systems.

'Videotex' is a new generic term used to describe systems in which coded data representing text or graphics, often by the 'page' (or Cathode Ray Tube screenful) are created, stored, transmitted and displayed. Such systems usually embody simple indexing systems, so a trained intermediary—the person who usually is required to operate computer-based information systems—is not needed. British systems include Prestel (Post Office), Ceefax (BBC) and Oracle (ITA).

I will not provide a technical description here—that has been well done elsewhere,^{4,5} particularly by Martyn⁶ in the context of this paper. I will just emphasize that Prestel is an interactive question-and-answer system, the 'terminal' being a modified television receiver connected to an ordinary dial telephone line. Up to about a quarter of a million information pages are available. Ceefax and Oracle, which usually may be received on the same terminal, are services broadcast on television entertainment channels, user interaction is rather limited, and pages are numbered in hundreds. Once you have paid for your receiver and for your television licence, Ceefax and Oracle are free. For Prestel you pay the Post Office for a local telephone call and for time connected to the Prestel computer, you also pay on a page by page basis (except for services sponsored by advertisers) to the provider who compiled the pages you request.

The conditions necessary for the successful propagation of so radical and capital intensive a project as Prestel are complex. They extend beyond a need for finance and the acceptability of new ideas—and I have to say that at present we in the UK are not at our best in these respects. They have included the monopolistic control of the entire system including the distribution network (the telephone system) but excluding the information itself, a rapid introduction of technical standards, and the existence of a revenue collecting system (that is for telephone accounts). Conditions not peculiar to the UK include the development of very complex integrated circuits or 'chips' providing the potential for compact, reliable, cheap receivers, the use of a here and now technology, and the concentration of many functions in one terminal so permitting the common use of components.

What are the chances of success? Success in the context of this paper means the widespread use of Prestel by citizens. One and possibly two of the ingredients which I mentioned earlier are present—the 'Act of Faith' capital has been provided by the Post Office and it seems likely that there will be enough subscribers even at present prices for the system to move into a less expensive phase. The demand will not be very large until the price of special TV receivers comes down to, say, current conventional TV prices plus £50. Since most TV sets in the UK are rented the impact on people's monthly rental would be low at that price. The British TV industry has not been that venturesome to date. Their hand may be forced by the Japanese who are now showing considerable interest (the ban on foreign imports ran out last September). Because the current high price discourages users there are not yet many of them; consequently the information providers are thinking twice before making a large database investment. Nevertheless it seems quite likely that by 1983 there will be at least half a million receivers in the UK and the price will have come down to a level where substantial numbers of citizens will possess receivers. The pace will have been set by business and other users who have a high occupational need for information.

In short I am predicting that technology-push and up-market demand will play their part, but that information being what it is, and incomes being what they are, Mr and Mrs Citizen will be in no mad rush. Fortunately I shall not be on the platform in 1983 to receive your derision by reason of this forecast being way out either way.

You will remember that I suggested that information about *living* comes top of the list, and that many people like face-to-face exchanges because they can get it all off their chests. For this important area I cannot see machines replacing people as a

source. I *can* see receivers installed in the offices of local authority bureaux, given the right databases the cost of the receivers could be recouped by the reduced time spent in seeking factual information for communication to clients.

I cannot see the kind of impact, anticipated for the US by Jones⁷ where the 90 minutes daily which he allocates for viewing interactive TV will be obtained out of a shorter working week—a sociological question upon which he does not expand. In the UK, excluding the cost of a receiver, assuming a viewing rate of 4 pages a minute on Prestel and a viewing cost of about 5p per minute, 90 minutes per week would cost £234 per annum. Bear in mind that a quality daily newspaper costs about £25 per annum.

I have suggested a far future scenario elsewhere⁴ in which some assumptions are made about the existence of a cheap ubiquitous wideband communications network, about a large screen Memex-like⁸ device, and about the social changes that this kind of universal information facility might bring about. Recently the French have started up a scheme which just might bring this scenario a little closer.⁹ They propose the mass production of a two-way video display terminal for connection to the telephone. It would be given free to all telephone users instead of printed directories. Assuming that a national network came into existence for this purpose then an information service of some kind could ride upon it at minimum cost, the major costs having already been amortized.

To conclude this paper let me tell you about another here-and-now Videotex system of a type which will probably not impact the average citizen for some years unless he or she receives indirect benefits by reason of its adoption by public information agencies. This system is likely to be used in the immediate future by those who can perceive the net benefit in time saved. The system is called PRIMATE, Standing for Personal Retrieval of Information, Manuscript preparation And Telecommunications Ensemble.

The existence of such a machine well illustrates the convergence of computers, data processing and telecommunications, and demonstrates what can be done with the compact inexpensive computer power now becoming available.

PRIMATE uses plain English on a microcomputer's television-type display to guide the user into indexing a serially numbered collection of papers. Subsequently it guides him or her into retrieving information by inputting words, strings or phrases which are then matched against the full text of the stored records describing the collection. The displayed records then retrieved indicate the serial numbers of the actual papers. The user is encouraged to put all incoming papers, such as reprints, advertisements, reports, leaflets, product data, newspaper cuttings, etc., into the same file so that he has a 'one-place-to-look' system. Since indexing is a chore which people like to postpone, PRIMATE is designed to encourage the simplest possible method of indexing which will produce a just-acceptable retrieval performance.

PRIMATE may also be used for manuscript preparation—that is, as a word processing (WP) machine, directly connected to a hard-copy printer. Telecommunication facilities are incorporated so that two PRIMATES may exchange data via the switched telephone network. The machine can also be used as a 'dumb' terminal, simulating a teletype machine, for accessing large remote databases.

In due course a range of new-generation information systems will become available with the aid of this machine. Weekly 'hits' from an SDI service or hits obtained from

an on-line service will be receivable on floppy-disc by mail, or will be telecommunicated. These hits will be cumulated for retrospective searching. Specialised files on particular subject areas for on-PRIMATE searching will become available.

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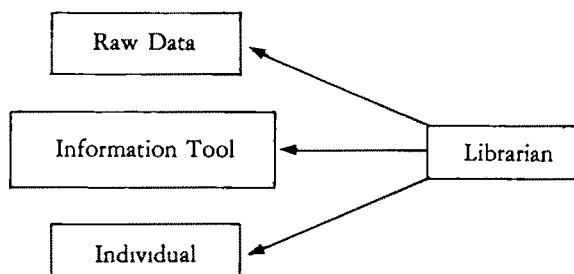
Computers and information for the citizen. What is missing? Where are the gaps?

Judith Bowen,

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Leeds Polytechnic.

Although I rather light heartedly agreed to talk to this title early on in the year, when I came to write the paper I found it difficult to explain the ideas I wanted to put forward today using the metaphors of gaps, and presumably bridges. I finally decided that this was because the gaps and bridges analogy assumes a model of information dissemination which seems to fit increasingly ill with some of the findings that recent research and action in public libraries has come up with. It does seem as though librarians and information scientists (and I am much more familiar with the former than the latter) define the problem as one of collecting all that there is about a topic and classifying it into generally accepted categories and then finding an appropriate and, more recently, an efficient channel for disseminating it to anyone who might happen to need it. The channel may be an old-fashioned and well tried bibliographical tool, a branch library card catalogue of local groups or societies, or a sophisticated automated interactive system like Prestel. The principle is always the same—that is to concentrate on organising the way the material is presented in order to make it intelligible to the user.

In some cases—in the use of bibliographies for example—it is assumed that the librarian may intervene between information and user, presumably to bridge the gap between professional knowledge and 'ordinary knowledge'. The assumption here is that the 'reference inquiry' results in the inquirer going away and putting the information received to good use—that is to help him improve his situation in some particular way. A traditional model therefore looks like this—



The problem is therefore that of organising the data in such a way that it is initially meaningful to the professional and, hopefully, to the individual if he is either

sufficiently intelligent to work it out himself or has had specific 'Library instruction'.

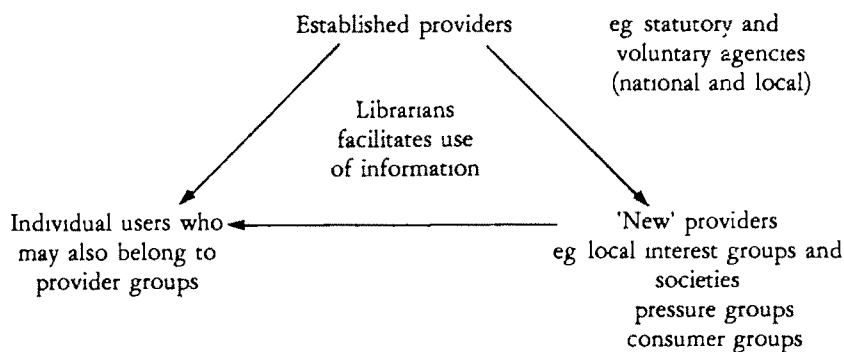
There have been several attempts recently to question this model as it applies for example to sociologists' use of information systems¹ but probably the most striking is the evidence which has come to light from the growth of information and advice services during the 1960s. If we take as an example the setting up of Housing Advice Centres, it can be quite clearly demonstrated that in the large majority of cases² insufficient information about services and legislation, or even lack of interdepartmental coordination, was not the main cause of homelessness but rather an insufficient supply of houses, particularly amongst the section of the community which was in the market for privately rented accommodation. This led many housing advice centres to modify their goals, particularly as they increasingly attracted people from the most deprived end of the market. The aims were therefore no longer to inform people about what was available and advise them on courses of action, but to get into the business of re-housing people, using unorthodox methods such as persuading building societies to give loans to tenants' groups and housing associations to earmark a percentage of their accommodation for the genuinely homeless. The example of the housing aid centres demonstrates rather starkly the fact that what may seem to be an information problem may in fact be a resources problem. In a somewhat similar way Citizen's Advice Bureaux and, more recently, Legal Advice Centres and other voluntary neighbourhood advice centres have demonstrated that people need not only information but also skills in putting that information to effective use.

However, the emphasis on the limitations of housing advice centres as 'bridging the gap' between existing provision and citizens with housing needs has in my view deflected attention from what was one of the barriers to effective use of available accommodation.

In attempting to solve some of their clients' problems the centres actually created new networks of providers (building societies, housing associations, tenants' groups and so on) and the sharing of information between these people was certainly a factor in obtaining partial solutions. In a somewhat similar way CABx saw that existing practitioners, lawyers and estate agents, for example, were inaccessible to clients and created the rota system of solicitor's surgeries. In both these examples although the second example may seem painfully obvious, it was not so much a gap that needed to be bridged but a barrier to effective communication which needed to be removed. In both cases this involved bringing together groups which had previously worked in isolation. The problem for information providers, therefore, is not how to channel information from a source to an individual, but how to identify and bring together previously unconnected sources of information and sources of need. I shall no doubt be criticised here by special librarians who will complain that this is precisely what they do, but I would argue that this is not a model traditionally recognised by public librarians, and that in talking about information and the citizen I am principally interested in how public librarians have changed their practice to acknowledge a model of information which recognises the linking function.

This model would recognise a range of provider networks and a range of user networks and the problem would be one of collecting information from both groups and of facilitating its exchange.

An alternative model of information provision



In many ways public libraries are ideally placed to perform this role and I will try to demonstrate to what extent there seems to be movement and the barriers within the profession which seem to inhibit movement. A useful meta-model for thinking about information and advice services is that developed by Butcher,³ who sees information and advice services as having goals either of improving access to services or of increasing people's ability to obtain services. Those having the second goal (an advocacy goal) may have to involve themselves in political action to obtain satisfaction and in his view these services are best managed by the clients themselves. Librarians who have systematically developed community information services seem, from a recent study at Leeds,⁴ to perceive themselves as having 'access' goals, particularly in relation to collecting a very wide range of information and to making people aware of it. They seem to view their role and their particular skills at the left hand of the continuum.

ACCESS GOALS		ADVOCACY GOALS
(i) Information collection	Information/ advice (eg CABx)	Information/action (eg HACs)
(ii) Information for awareness raising ('preventative' information)(eg LIBRARIES)		

EXAMPLES

(i) Ephemera from statutory and voluntary bodies Alternative press publications. Local authority documents Card index files of local information.	Presenting options and interpreting in light of clients' needs; advising on action; assistance with action.
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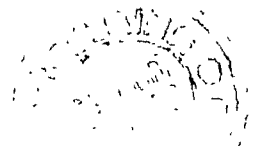
(ii) Display	Case work	Negotiating with building
Newsletters	Surgeries	societies and housing
packaging	Tribunal escort	associations.
referral services		Re-housing
		Information to
		government as
		pressure group.

What is of interest is that they have extended existing practices of collecting directory type information about local groups and societies to include a much wider range of agencies involved in the field of 'social problems', and that they also identify their particular contribution as the provision of any kind of information at a very local level. At the same time they have increased their collections of ephemera from national and local organisations over a wide range, the criterion for choice again seems to be whether or not it would be useful to that particular community. They have encountered various traditional practices which make this difficult, often to do with library purchasing policies and the difficulty of finding library suppliers who stock the material. In order to collect local information they have been obliged to widen their community contacts and one condition of a good local information file seems certainly to be freedom for the librarian to move outside his branch.

Although there are indications that public libraries have thought innovatively about collecting information and have been much more imaginative in building up providers' networks, there is less evidence that they have been effective in the 'linking' role described above. There seem to be two alternatives available to them if they are to develop this and it is too early to make any comments on which path they may take—in fact it may well be that the physical constraints of space and/or staff will lead to different solutions in different libraries. One solution is to find outlets for information services where other groups can use the information to support existing activities. Examples of these would be day centres, residential homes, youth clubs, schools and, in many cases, an information service would supplement an existing book collection.

The other solution is to attract groups into the library and there is certainly some evidence that where the library is part of a cultural directorate this may be relatively easy. There is some evidence, too, that it is easier where corporate management is practised at grass roots level rather than preached at policy-making level and that public librarians will need to work with other local officers and probably volunteers to get their library used. Neither of these solutions is particularly new in the sense that public librarians have always put collections in other locations and provided rooms for clubs. If they are to facilitate information exchange, then a much larger proportion of the library effort may need to go towards this at the expense of traditional lending and traditional reference services with their emphasis on the individual reader or the individual inquirer. It will also need much more precise knowledge about other peoples' systems.

It is not immediately obvious how technology is going to help in this process, other than in speeding up the compilation and updating of directories and card files,



in other words in improving the technology of traditional reference service and in creating the facility for similar processes to be used for local information. This could mean that computerized systems might simply replace existing bibliographical tools without changing in any way the style of service delivery.

In theory, then, the new technology should release the librarian from many of the chores connected with information collection, organisation and updating in order to concentrate on the task of getting the resources used. If this does not happen there seems little possibility that public access to information will be increased in any significant way and some danger that it may be diminished.

I should like to end by pointing to the evidence which is accumulating about how people actually use libraries and about how public library practice is changing. Some of this is on the debit side and some on the credit side. In a recent study at Leeds⁵ we found support for the view that people use public libraries for information on a self-help basis rather than by asking librarians questions. We also found that using the library to look up information was associated with knowledge of other information and advice services in the area. This suggests that libraries will continue to attract the person who is more likely to look something up in a book and to feel competent to use that information once s/he has got it, unless the style of service delivery changes.

A recent study carried out by Marian Barnes in two large central libraries⁶ shows that interaction between librarian and user in the reference inquiry is very limited, both in the duration of the interaction (a finding confirmed by the Leeds study) and in the extent to which the librarians distinguished between different kinds of queries. This again suggests that libraries assume that users are fairly sophisticated and would account for the fact that they continue to gear service to the better educated.

A more recent study at Leeds⁴ showed that, whereas librarians are prepared to accept a very wide range of information categories, in practice they will be selective about the sources of information they use. These are more often confined to information produced by national statutory and voluntary agencies which are well-known and established. There is in addition a tendency to distinguish between information which the library will hold and that which it will actively display and promote. It is not uncommon for librarians to be criticized by councillors or other users for displaying information about homosexual groups for example, similarly there is a 'grey area' of political material from alternative and radical groups about which public librarians feel sensitive.

These three factors, the assumption that people can use material themselves, the rather limited nature of interaction in traditional reference inquiries and the reluctance to display and promote controversial material may well prove a barrier to improving genuine citizen access and would counteract any benefits to be gained from improved technology. On the positive side, however, there is evidence that public library practice is changing, particularly at branch library level where librarians have seen the need to improve local information networks. There is an increasing readiness to involve other groups and agencies in the provision of information and referral services, to bring groups into the library for purposes only loosely related to books, more freedom for librarians to move outside the library and develop services with other professionals, and the growth of local studies collections which aim to gather and display material about the everyday life of the community. These moves are sometimes tentative and hesitant and, unfortunately, often gain only tacit support from senior management.

In the long run, though, they seem to offer more hope for facilitating the use of information rather than simply improving the communication of information. Lawrence Stenhouse, discussing the problem of dissemination of research findings in education has said that 'community is more important than communication in the utilisation of research'. The same approach to information services is necessary, I feel, if public libraries are to begin to break through some of the barriers identified.

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Socio-economic implications of the new information technology

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Over the past year or so I have been invited to speak on this subject by the Department of Education and Science, the Library Association, and the Community Projects Foundation. Rating the acceptance of my ideas on a ten point scale with 'one' as total acceptance and 'ten' as total rejection I would guess that I have scored 1.5 to 6, I will leave you to assign the organisations to the scores.

I may have some pre-conceptions of where the Aslib Computer Information Group will figure but that is one piece of information I do not intend to make freely available—yet.

Let me start with two points on which we will perhaps agree

- (1) That information is a vital national resource and
- (2) That it is a resource that costs money.

The special problem with the new information technology is that its costs are highly visible. In addition, the application of this technology comes at a time when the Government is, with the exception of the increased expenditure on the police, defence and private education, committed to reducing public expenditure. This combination of circumstances has led some people to consider, nay suggest, the imposition of direct charges on the users of 'computer information services', even when they are provided via public libraries.

Arguments against direct charges on the users of public library services are to be found in publications issued by authorities in this country and abroad. Indeed the principle of free and equal access to information and ideas is embodied in most contemporary statements of library purpose.

Up until now this general agreement on the principle of a public library service free from direct charges has helped protect the citizen's rights to information—a right which has been described as the 'fourth right of citizenship'.¹ The introduction of direct charges would fundamentally alter this view of information as a right. If direct fees are introduced there is a real danger that information will become just another commodity to be distributed according to the mechanics of the market place. Now some may not object to this; they may well believe that that is the way information should be supplied. Some, however, try to justify charges because of the cost of the new technology. This is a specious argument. There have always been costs involved in collecting, organising and disseminating information. Costs are not a new factor in the debate on user fees or pricing policies.

The question now, as in the past, is how those costs are to be met. In the public library service they have been traditionally met from public funds. The arguments for

doing this are well known, I have no time to discuss them now but will simply say that I believe that the citizen's right of free and equal access to knowledge is fundamental to our concept of a democratic society.

In practical terms the imposition of direct user fees would withdraw that right from many of our citizens. It would certainly withdraw it from the 'information poor' a group already vulnerable for social, economic, geographic and other reasons. This group are in any case going to be badly served by the new information technology if its development is left entirely to the commercial sector. Those who have watched the development of Prestel will be aware that the costs of putting information into the system will be well beyond the economic reach of many of the small information providers so common within the field of community information.

If market forces are given free rein, the new technology could result not only in an information elite among users, but perhaps more dangerously, an elite group of information providers. This would increase the tendency for information and ideas to flow from the top downwards with all the resultant social and political consequences.

It is also possible that in the future some information will only be stored in electronic systems. What then happens to those 'individuals and groups who are outside the system because of personal desire, poverty, geographical location or other reasons'?

However public libraries also provide information services to their own local authorities and also to local industry and commerce. It has been suggested that when considering charging policies public library authorities should differentiate between a public service to the general public and the private commercial use of that service. A fee, it is suggested, could/should be charged to commercial organisations that can often well afford to pay.

This is a tempting argument but there are I think four reasons why, at least we should not rush headlong down the path it suggests:

1. Local firms are already contributing to the library service through the rating system.
2. Local firms are contributing to the well being of a local authority's area by providing employment.
3. The existence of a pay service for industry and commerce might lead public libraries to 'purchase technical and commercial sources, irrelevant to the lay person whom (they) primarily serve'.³
4. In times of economic stringency it would be tempting for public library authorities to concentrate on providing profitable services to industry rather than providing services to meet the needs of the citizen.

Certainly commercial information services limit their service to those who can pay. This means that they limit the range of information that they collect and disseminate. While there is an obvious overlap between public and private information services in the areas of business, commerce and industry, it is largely left to the public sector to provide community information for the citizen.

Those who seek to model public library information services on those provided by the private information industry are not comparing like with like. There are significant differences between the two client groups, and in the final analysis the objectives of the public and private sector are quite different.

So far I have concentrated on the question of fee or free. Some have advocated a compromise of 'partly' free where say the first 10-15 minutes of a search are free of charge and the user pays for any extra work. In the USA, while many libraries do provide free on-line search facilities others charge different rates for a standard search and a custom tailored search.

Once this happens though we are moving away from the basic idea of free and equal access to information and ideas.

It is in fact quite impossible to discuss one form of information provision in isolation. If we look at other parts of the communications world we can see only too clearly how the market has affected the nature of the information supplied through it.

In closing then let me ask you to consider four further points that we can perhaps take up in discussion:

1. The way market pressures can 'shape' the information that an organisation disseminates.
2. Accuracy, bias, and how these might be affected by the economics of the new technology.
3. The concentration of ownership in the communications industry.
4. The opportunities provided by the new information technology—that might not be taken up if it is operated entirely on the basis of commercial considerations.

Well maybe I have said enough to have some of you hitting the 'ten' on my ten point scale. I shall have to see if my own pre-set figure needs adjustment as a result of the discussion I hope we shall have later.

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Educational implications of the new information technology

Michael Aston

Advisory Unit for Computer Based Education,
Hatfield

We, the educationalists, have never been very good at incorporating new technologies into the educational system.

The programmed learning machine and the language laboratory are two examples of our failure. There are some common elements to both, namely the rigid nature of the software and the lack of a teacher-interactive control. Television has been a partial success. The Open University and the Schools Broadcasting Council have explored the medium and used it to great advantage in the learning process. We can say that we are quite good at *using* television, but we have consistently failed to teach children *about* television—not how it works but an approach to the discriminatory process of its content. Communication studies is only recently beginning to infiltrate the curriculum as a subject worthy of serious study.

We have had computers available to us in a variety of forms since the middle sixties. There has been no coherent policy nationally. Developments have taken place in pockets all over the United Kingdom, sometimes in single schools, sometimes in consortia associated with colleges and universities and occasionally within a local education authority.

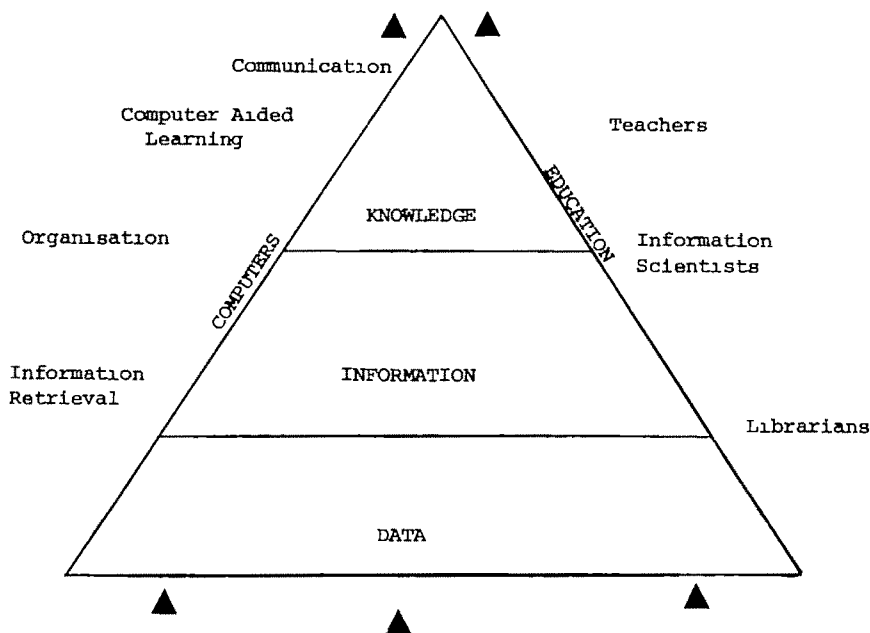
Teaching about computers has become respectable and we examine in Computer Science at all levels from CSE to M Sc. Learning via the computer is still very much in its infancy in this country and developments are slow to take place. This is not our fault. There is little in the way of research, no support as yet from the Department of Education and Science, massive pressures from the examination system which perpetuates traditional curricula; LEA's are mainly staffed by arts graduates who are sympathetic but not likely to be innovative in this field. Now we have relatively cheap micro-computers offering a powerful new tool for learning. They could not have appeared on the scene at a worse time. There is no money available in the education system at this crucial time to make good use of micro-technology in the classroom. We can, with the help of parent-teacher associations, just about raise enough finance to purchase hardware—but support for software and applications developments is not forthcoming.

So what is likely to happen? Many homes already have both television and the telephone. Micro-computers will fall in price relatively speaking and find their way into the home, as the electronic calculator has already done. The role of the teacher in the traditional sense is going to be threatened by these home developments. Already many children are being 'educated' by television rather than by the school system. With multi-purpose intelligent terminals in the home using the TV set as output both

for information and computer-aided learning packages which will run on the in-house micro-computer, we will have an efficient distance learning system linked to almost anonymous centres.

What will be the role of the parents? In some ways, we may see the parent changing roles with the teacher. Education will take place in the home, leisure in the institution which we now call school. We can set all this against the backcloth of an inevitable shift from the work ethic to the leisure ethic and a search for new energy sources.

We must ask ourselves what kind of education do we need for a non-working society? Will mathematics revert to being a leisure activity as it was for the Greeks or that special breed of puzzle solvers who read the heavier Sunday newspapers? Increases in vandalism, crime and suicide could all be laid at the door of a poor education system. Need we all be bored as we enter the age where information will be the main currency? The answer need not be 'yes'. I am not pessimistic. We may go through another dark age but the tunnel of light will lead us to a much richer world where education is very much the number one industry.



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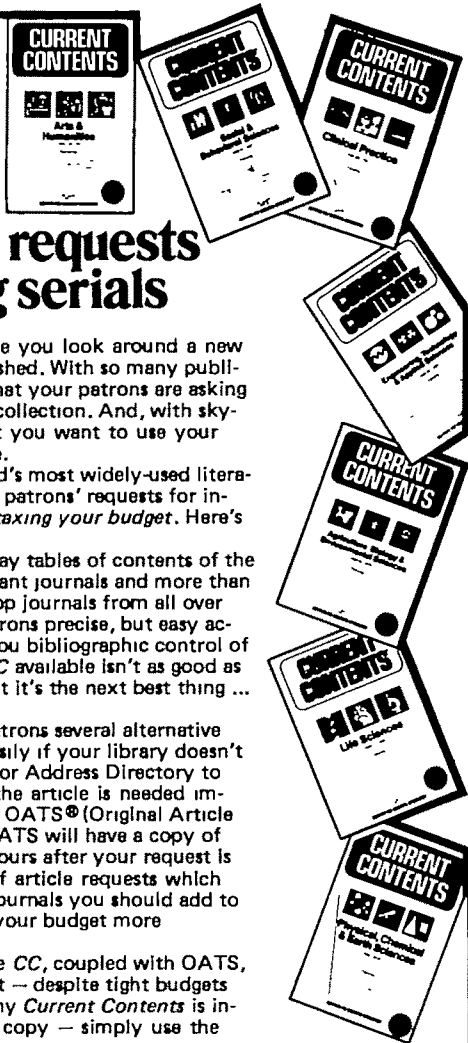
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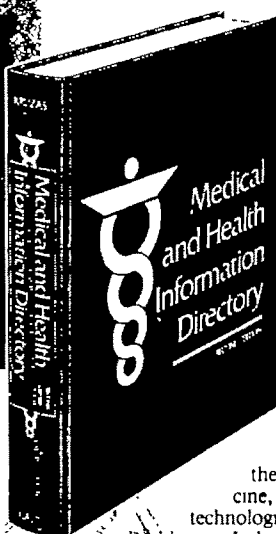
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Recall and precision devices in interactive bibliographic search and retrieval systems

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An index language usually incorporates various methods for improving recall and/or precision when searching. Recall devices tend to increase the size of retrieved document sets, while precision devices tend to reduce them.

The most common recall and precision devices are described in general terms and their usage in several thesauri is examined. The thesauri looked at relate to databases available for searching in the ESA IRS online information system at one time or another and include the NASA Thesaurus; Thesaurus of Engineering and Scientific Terms; Thesaurus of Metallurgical Terms; Subject Headings used by the USAEC; Subject Headings for Engineering; INIS Thesaurus and the INSPEC Thesaurus.

The extent to and the way in which the recall and precision devices are used in the ESA IRS online system for controlled and uncontrolled subject term searching are discussed

1. Introduction

AN INDEX LANGUAGE usually incorporates various methods for improving recall and/or precision when searching. The recall devices increase the size of the document sets, broaden term definition and reduce the size of the index and search vocabulary. Precision devices on the other hand, reduce the size of the document sets by restricting term definition and increase the size of the vocabulary.

The most common recall devices are:

- synonym control
- term linkage
- control of word forms
- clustering

and the most common precision devices are:

- coordination
- links
- role indicators
- weighting

Each of these devices is described in more detail below.

It should perhaps be noted that while the index language will normally be used for both indexing documents and their subsequent retrieval, not all the devices will be

equally helpful to both uses. It is of course also little use assigning for example links at the indexing stage if they cannot be subsequently used at the searching stage.

Also because of the inverse relationship between recall and precision, there will be a tendency for recall to improve only with a corresponding reduction in precision.

2. Recall devices

2.1 *Synonym control*

This device makes for consistency since the vocabulary user is directed to one specific term from other synonymous terms e.g. Bogs *use* Marshlands and the user does not have to think quite so much about which alternative term is the most suitable concept. The vocabulary is thus reduced in size and at the same time the term definitions are broadened somewhat to take into account the nuances of the synonymous terms.

e.g. DECREMENTING }
 DIMINUTION } USE REDUCTION
 SHORTENING }

This is one device which is helpful to both the person indexing documents and to the person trying to retrieve documents since both will benefit from word control. The searcher also stands a much better chance of using the same terms as the indexer did.

Recall will tend to be improved by such synonym control, but possibly at the expense of precision, since while, for certain users, in the example below, there may be no real difference in meaning between 'bogs' and 'swamps', there may be a very real difference between 'salt marshes' and 'bogs'. The distinction has been discarded by such control.

MARSHLANDS *used for* BOGS
 COASTAL MARSHES
 MARSHES
 SALT MARSHES
 SWAMPS

2.2 *Term linkage*

The most common form of term linkage is in fact hierarchical linkage. A hierarchy expresses relationships of super-/subordination of concepts. In indexing it is probably useful to have a display of term relationships if the policy is to index both generically and specifically.

For searching, however, by moving from a more specific term to a more generic one, the device allows a broadening of the search strategy and thus the retrieval of more documents

e.g. AIRFOILS
 WINGS
 CAMBERED WINGS
 SWEPT WINGS

SWEPTBACK WINGS
 ARROW WINGS
 DELTA WINGS
 SWEPTFORWARD WINGS
 UNSWEPT WINGS
 RECTANGULAR WINGS
 VARIABLE SWEEP WINGS

Thus a broader or more generic term than 'delta wings' is 'sweptback wings'. Similarly a broader term still is 'swept wings' and so on. Here again though as recall is increased the precision will decrease since as is seen from the example 'swept wings' includes not only 'sweptback wings' but also 'sweptforward wings'.

By moving down the hierarchy, the search is narrowed, becomes more specific resulting in fewer documents being retrieved, but being more relevant.

A term can belong to one or more hierarchies depending on its use.

e.g. HEAVY WATER
 BT # CHALCOGENIDES
 DEUTERIUM COMPOUNDS
 # HYDROGEN COMPOUNDS
 OXIDES
 # WATER
 # implies new hierarchical structure.

Relationships between concepts that are not hierarchical nor equivalent are given in most thesauri as part of the structure. A variety of relationships can exist between concepts such as antonymy, instrumental, material, cause and effect, explanatory, utilization and similarity. These are examined in greater detail in a later section.

2.3 Control of word forms

This is essentially a searching device rather than an indexing device and implies the acceptance of all variant word forms rather than just one. Thus all words having the same root or stem are compounded into one set or group—usually by truncation. Thus in the example below

e.g. REFLECT ANCE
 REFLECT ED RADIATION
 REFLECT ED RAYS
 REFLECT ED WAVES
 REFLECT ING TELESCOPES
 REFLECT ION
 REFLECT ION COEFFICIENT
 REFLECT IVITY
 REFLECT OMETERS
 REFLECT ORS

A searcher might specify any terms with the stem REFLECT. The indexer on the other hand could have specified that any inflected endings (usually verbal and adjectival

forms) would be posted under the same noun form, thus parts of speech like REFLECTING, REFLECTED, REFLECTS would all be indexed under REFLECT

Recall for requests on reflection properties of surfaces will obviously be improved, but for a user requiring information on how to construct a reflecting telescope, precision will be greatly impaired.

This situation can be avoided at the indexing stage by not posting to the single concept 'reflect', but instead posting to the separate terms and making provision at the search stage for any compounding. This in fact can easily be done in an online system.

2.4 Clustering

By clustering index terms on the basis of statistical association between them, recall can be improved since the set of documents will be enlarged.

For example, if the term 'blight' frequently appears in the index records of documents when the terms 'corn, crop vigor, and vegetation' appear, and the term 'rust fungi' also appears frequently with the three terms above, then some kind of relationship can be assumed to exist between 'blight' and 'rust fungi' and the two could be substituted when searching

3. Precision devices

3.1 Coordination

There are two types of coordination—precoordination, where an intersection between concepts has already been made

- e.g. psychoacoustics (psychology *and* acoustics)
- evaporative cooling (evaporation *and* cooling)
- missile control (missile *and* control)
- magnetohydrodynamics (magnetic fields *and* hydraulics *and* dynamics)

—and post coordination, where the intersection between independent terms (uniterms) is made later at the search stage

- e.g. computers *and* design (computerized design)
- females *and* humans (women)
- coral *and* reefs (coral reefs).

The device reduces the size of document sets by demanding the simultaneous appearance of specified keywords in the index record. It (i.e. precoordination) also helps reduce the size of the vocabulary, the number of documents assigned to terms, and false associations

For example consider the concepts: spacecraft motion, particle motion; motion pictures; vertical motion; stellar motion, time and motion. Here six different concepts are described with six unique precoordination expressions. If a postcoordinate dictionary were used then seven concepts would be required: spacecraft, particle, pictures, vertical, time, stellar and motion. Whereas the term spacecraft motion would contain only documents relating to the motion of spacecraft, clearly the single term

motion will cover not only documents relating to the motion of spacecraft, but also particles and stars as well as films and helicopter flight. This leads to high term postings with their attendant difficulties such as lack of core storage and false drops. Postcoordination can thus be rather uneconomical at times

3.2 *Links*

A link is a method by which the number of false coordinations likely to occur in any post-coordinate vocabulary can be reduced. The links show clearly which concepts in a document relate to each other and are thus usually added at the indexing stage. Links can be used to advantage in a document such as an annual report in which there are many separate unrelated sections

Consider for example a document treating the American influence on European Space Programmes and indexed under the concepts, Europe, Influences, Space Programmes, USA. This could be wrongly retrieved in a request for information on European influence on American Space Programmes. Such a false association could be avoided by assigning links (e.g. numbers) to the various elements thus

USA (1) Influences (1) Europe (2) Space Programmes (2)

This would show clearly that USA was linked to influences and Europe was linked to Space Programmes and not vice versa. Thus the document would not be falsely retrieved in response to the above question.

3.3 *Role indicators*

Sometimes it is not merely sufficient to show that two terms are linked. It must be shown *how* they are linked i.e. the role they play in relation to each other. For example consider a request for information on the 'effect of venom on sea snakes'. If the index terms are simply 'venom' and 'sea snakes' then probably in this case much irrelevant information on the 'venom produced by sea snakes' would be retrieved. Such a situation could be avoided if role indicators were used to distinguish the different concepts

e.g. SEA SNAKES (M)	SEA SNAKES (R)
VENOM (P)	VENOM (A)

where M manufacturer or producer

P product

R. recipient

A agent.

Thus if the appropriate role indicators above were added at indexing time, then these could be also used at retrieval time to obtain the desired information—in this case VENOM (A) and SEA SNAKES (R)

3.4 *Weights*

This precision device is also normally applied at the indexing stage where the indexer assigns weights to the concepts he thinks are the most important in a document. In

general the higher the weight the more important the concept though usually there is a fixed scale which limits the size of the weight. In retrieval the searcher can establish a cut-off point so that only documents with a given weight will be retrieved and ranked in accordance with the weight.

Various formulae for calculating weights are available and these can also be used to rank outputs.

Weighting can in fact simulate Boolean logic as the following example will show. Consider a request for information on the performance of swept winged aircraft during low level supersonic flight. The terms available are weighted thus:

- | | | |
|----------------------|---|---|
| (a) swept wings | } | 3 |
| (b) delta wings | | |
| (c) sweptback wings | | |
| (d) low altitude | } | 2 |
| (e) ground level | | |
| (f) supersonic speed | | 1 |

and the threshold value is 6. The weighting refers to the group rather than the individual terms, thus the searcher must have at least one term from each group present in the document for the threshold to be obtained and any documents to be retrieved i.e. (a or b or c) and (d or e) and $f=3+2+1=6$.

Weights must be assigned rather carefully. For instance in the example above, if the weight 3 was assigned to each of the wing terms, the weight 2 to each of the altitude terms and the weight 1 to the speed term, then the overall total would be 14. If the threshold was set at 14 it would mean that every single one of 6 terms would have to be present and this would probably be too restrictive as well as unnecessary.

However, if the threshold was left at 6, then this number could be made up of two weight 3 terms or one of the wing terms and both the altitude terms and so on. Clearly, these will not produce the precise result looked for (remember though that 6 is the lowest, not the highest value).

If the threshold were 10, then possibly all three of the weighted 3 terms would be retrieved—but in addition either one of weight 2 terms or the weight 1 term would have to be present also so that 10 (or more) is reached.

4. Index language devices in various thesauri

4.1 Introduction

Any index language can be dissected to display its various devices. In this section various index languages or thesauri are examined to find their devices and how they work. The thesauri looked at relate mainly to the files available for searching in the ESA Information Retrieval Service QUEST system and are briefly described below.

It should be noted that no attempt is made to analyse the shortcomings of the thesauri nor to comment in depth on their structure and methods of compilation.

4.1.1 NASA Thesaurus Alphabetical Update (TAU) The NASA TAU is an alphabetical listing of all subject terms (postable and non-postable) that are currently approved for

use in the NASA scientific and technical information system. The subject terms have been chosen on the basis of their significance and use in aerospace literature and their effectiveness in incorporating productive retrieval concepts. Terms are presented in noun form generally in the plural, with the direct form of entry. Descriptor definitions and scope notes are given in cases of ambiguity.

4.1.2 Thesaurus of Engineering and Scientific Terms (TEST) The EJC TEST is a list of engineering and related scientific terms and their relationship for use as a vocabulary reference in indexing and retrieving technical information. The terms appear in alphabetical order together with their hierarchical structure, other cross-references and scope notes. Terms are given in noun and plural form where possible and the direct form of entry is used. Terms that have more than one accepted meaning are accompanied by an explanation.

4.1.3 Thesaurus of Metallurgical Terms The ASM Thesaurus is designed to provide for its user a working vocabulary in the field of metallurgy and those areas of other sciences and technologies closely related to metallurgy, by serving as a 'road map' through the engineering vocabulary, showing each term in its relationship to others. The thesaurus is essentially an information retrieval tool, though it has other applications e.g. indexing.

4.1.4 Subject Headings used by the USAEC Each entry consists of a subject heading carefully chosen to express a concept or idea. The purpose of the thesaurus is to assist the indexer in locating the correct word to express the concept to be indexed and to lead the searcher to the indexing for the concept to be found. Since a mere alphabetical listing is not sufficient a vocabulary network is provided which lists not only approved subject headings, but many cross-references between these headings and synonymous terms.

4.1.5 Subject Headings for Engineering (SHE) SHE is an alphabetical list of terms in use as a controlled vocabulary for indexing the transdisciplinary literature of engineering and related sciences. SHE is the basic tool for indexing using the nomenclature derived from the literature of the many specialized areas of engineering and technology.

A further thesaurus is also available for searching the engineering literature.

4.1.6 INIS: Thesaurus This thesaurus contains the terminology to be used for subject description, and is a systematical and/or alphabetical collection of descriptors, non-descriptors as well as indicators of their relationships.

4.1.7 INSPEC Thesaurus The INSPEC thesaurus of terms for physics, electrotechnology, computers and control can be used either as a controlled language for indexing or searching, or as a natural language and at the search stage for suggesting new terms. The thesaurus consists of an alphabetical list of postable terms and 'lead-ins' which displays term relationships, both generic, associative and equivalent. In addition, scope notes are given. A separate section gives the hierarchical chain of terms.

4.1.8 *NASA Thesaurus 1976* The NASA thesaurus (TAU) referred to above has recently been updated and now takes a completely different form. Whereas in TAU only the BT and/or NT of a particular term in alphabetical order were given, it is now possible to see the generic structure of the term at a single glance. The generic structuring is complete for all terms and shows all relationships to generally related terms

e.g. TAU

HILBERT SPACE
NT BANACH SPACE
BT ALGEBRA
ANALYSIS (MATHEMATICAL)
FUNCTION SPACE
FUNCTIONAL ANALYSIS
METRIC SPACE
VECTOR SPACE

NT76

HILBERT SPACE
GS ALGEBRA
VECTOR SPACES
HILBERT SPACE
BANACH SPACE
ANALYSIS (MATHEMATICS)
FUNCTION SPACE
HILBERT SPACE
BANACH SPACE
FUNCTIONAL ANALYSIS
HILBERT SPACE
BANACH SPACE

The new structure is, in fact, less readable than the old TAU making it more difficult to check terms.

4.2 Recall devices

4.2.1 *Synonym Control* In any classification system it is possible to control synonyms by referring from a 'forbidden' synonymous (non-postable) term to another valid or postable term. In each of the thesauri this is done by clear reciprocal cross-referencing. For example in the NASA TAU, where there are 14002 postable terms and 3187 non-postable, the notation USE, indicates that the term is not postable and that the following term should be used instead.

e.g. FIBERGLASS
USE GLASS FIBERS

Similarly USED FOR is the reciprocal of the USE cross-reference and identifies postable terms

e.g. GLASS FIBERS
UF FIBERGLASS

The same method and notations are also used in the ASM Thesaurus, INIS Thesaurus, TEST, INSPEC and NT76.

In the Subject Headings used by the USAEC, the same principle is employed, but instead the notation is SEE and the reciprocal indicated by a cross (X). The see reference always refers from a term not used as a subject heading to the preferred subject heading and in most cases the two terms so connected are synonyms or near synonyms.

e.g. CERAMIC ENAMELS
SEE PORCELAIN ENAMELS.

The reciprocal entry will thus be:
PORCELAIN ENAMELS
X CERAMIC ENAMELS.

The SHE lists preferred subject headings and also uses a see reference between synonymous concepts.

e.g. BRICK
 Manufacture *see* BRICKMAKING
 AIR CUSHION VEHICLES *see* VEHICLES—Ground effect

A point to note is that no reciprocal headings are provided.

4.2.2 Term linkage

4.2.2.1 *Hierarchical linkage.* A hierarchy allows the relationships between terms to be shown by cross-references, e.g. (NASA TAU)

e.g. HEOS SATELLITES
 UF HIGHLY ECCENTRIC ORBIT SATELLITES
 NT HEOS A SATELLITE
 HEOS B SATELLITE
 BT ARTIFICIAL SATELLITES
 EARTH SATELLITES
 ESRO SATELLITES
 SATELLITES
 RT EUROPEAN SPACE PROGRAMMES
 SOLAR ORBITS

The NASA TAU gives and explains the following notations:

Broader Term (BT), Narrower Term (NT), Related Term (RT), Use (USE), Used For (UF).

These cross-references are also used in the other thesauri and normally have the following specific applications.

Broader term— indicates that the term(s) following the BT notation represent more inclusive concepts that cover, among others, the term used.

e.g. ALUMINUM ALLOYS
 BT ALLOYS.

Narrower term—indicates that the subject term(s) following the NT notation represent more specific concepts than the term used; it is a reciprocal of the BT.

e.g. ALLOYS
 NT ALUMINUM ALLOYS

Related term— indicates that two indexable terms are closely related but are not structured within the broader/narrower tree or hierarchy.

e.g. RADAR EQUIPMENT RADIO EQUIPMENT
 RT RADIO EQUIPMENT RT RADAR EQUIPMENT

USE— indicates that the term is not 'postable' and that the following term should be used instead.

e.g. COLUMBIUM
 USE NIOBIUM

USED FOR— is the reciprocal of the USE cross-reference and identifies postable terms.

e.g. NIOBIUM
 UF COLUMBIUM

In certain of the thesauri the degree of specification is taken to some lengths as is shown by the following example from TEST.

VERTEBRATES
 MAMMALS
 EUTHERIA
 UNGULATA
 ARTIODACTYLA
 RUMINANTS
 CATTLE
 BEEF CATTLE

The new NASA Thesaurus shows the exact relationship of one term to another by giving a complete generic structure with the result that terms are repeated several times:

LIQUID NEON
 GS CHEMICAL ELEMENTS
 RARE GASES
 NEON
 LIQUID NEON
 GASES
 LIQUEFIED GASES
 LIQUID NEON
 RARE GASES
 NEON
 LIQUID NEON
 LIQUIDS
 LIQUEFIED GASES
 LIQUID NEON

The cross-reference structure for TEST and INSPEC are similar to that of the TAU, with reciprocal entries for each cross-reference e.g. (from TEST)

CLOTHING
 UF APPAREL

FOOTWEAR

HOSIERY

SOCKS

NT ARCTIC CLOTHING FOOTWEAR HOSIERY SOCKS	BT CLOTHING NT BOOTS (FOOTWEAR) SHOES	BT CLOTHING NT SOCKS RT FOOTWEAR	BT CLOTHING HOSIERY RT FOOTWEAR
RT APPAREL FABRICS	RT ARCTIC CLOTHING HOSIERY SOCKS		

TEST, TAU and INSPEC do in fact give a hierarchical index displaying descriptor families based on BT-NT references. INSPEC contains Top Terms (TT) which are the most general (broadest) terms of any category. In addition, INSPEC used also to include older terms which had been used previously and were superseded.

The cross-reference notations in the ASM Thesaurus are also similar to those of NASA.

The Subject Headings used by the USAEC employs a different approach in that only two types of cross-references are provided—SEE and SEE ALSO references. The SEE reference as has already been noted is used to relate synonymous terms. However, it can also be used to refer from a generically narrower term to a broader subject heading of the same class.

e.g. METALLOGRAPHIC MICROSCOPES See MICROSCOPES

as well as vice versa

e.g. SPRAYING See METAL SPRAYERS

The SEE ALSO reference is used either to connect two subject headings of related meanings or to connect a broad subject heading with all narrower headings of the same generic class. Thus for example

CAMERAS

See also ELECTRON CAMERAS

See also GAMMA CAMERAS

See also PHOTOGRAPHY

See also POSITRON CAMERAS

See also X-RAY CAMERAS.

Here are given not only the more specific types of camera, but also photography, a term related in meaning. The reciprocal headings are represented by an X for see references and XX for see also references

e.g. PHOTOGRAPHY

See also CAMERAS

XX CAMERAS

The SHE uses a similar structure, however, words are not entered directly. Thus the user will not find landing gear in the alphabetical order under L. The term is just not there. However, if he looks under aircraft he will find landing gear as a sub-heading. In fact in this instance the user is referred away from the sub-heading to a main heading namely AIRCRAFT LANDING GEAR.

4.2.2.2 *Non-hierarchical linkages* As noted previously various relationships can exist between terms that are neither hierarchical nor synonymous. Below some examples taken from the different thesauri illustrate the types of relation.

(a) antonymy

LINEARITY	CLOSED CYCLE EHD GENERATORS
RT NONLINEARITY	RT OPEN CYCLE EHD GENERATORS

Sometimes in fact the antonymy is not reflected by separate terms, but instead one concept is used to express both relationships.

FREEZING POINTS *USE* MELTING POINTS
 ANTINUCLEONS *USE* NUCLEONS
 ANTIFERROELECTRICITY *USE* FERROELECTRICITY
 INSTABILITY *USE* STABILITY

(b) instrumental

FARM CROPS	FOREST FIRES
RT HARVESTING	RT FIREFIGHTING
SHIP ANCHORS	AIRFOILS
RT ANCHORING	RT LIFT

(c) dependency

FARM CROPS	EGGS	WOOL	HARBOURS
RT IRRIGATION	RT POULTRY	RT SHEEP	RT ESTUARIES

This relationship could be considered the reciprocal of the instrumental relationship.

(d) material

CONCRETES	MOTOR BOATS	CLAYS
RT PAVEMENTS	RT PLASTIC BOATS	RT BRICKS

(e) utilization

AIRSHIPS	BRICKS	GUINEA PIGS
RT OBSERVATION	RT BUILDING	RT LABORATORY
AIRCRAFT	STONES	ANIMALS
MOTOR CYCLES	MOUTH	
RT MILITARY	RT MASTICATION	
VEHICLES		

(f) explanatory

AIRSHIPS	WOLF PACK
RT INFLATABLE STRUCTURES	RT SUBMARINES

(g) cause and effect

PROFITS	PRINTING	APPRENTICESHIPS
RT TAXES	RT READING	RT STUDENTS

(h) similarity

TEACHING MACHINES	REVENUE	RETARDING
RT TRAINING DEVICES	RT INCOME	RT ARRESTING (PROCESS)

It should be noted that the above relationships are not the same as synonymy, although the example below could very well be. In fact the two terms are not even shown as related in the TAU

ALTITUDE SIMULATION and SIMULATED ALTITUDE

(i) specificity

CYLINDERS	DIESEL LOCOMOTIVES
RT CONCENTRIC CYLINDERS	RT DIESEL ELECTRIC LOCOMOTIVES

(j) generality (the reciprocal of specificity)

CIRCULAR TUBES
RT TUBES

The latter two relationships could—possibly should—have been given as narrower/broader term relationships rather than as related terms.

A term can of course have any combination of the above relationships.

e.g. AIRSHIPS

RT INFLATABLE STRUCTURES (explanatory)
OBSERVATION AIRCRAFT (utilization)

BRICKS

RT CLAYS (material)
BUILDING STONES
(utilization)

ANTIPARTICLES

RT NEUTRONS (antonymy and generality)

It is worthwhile pointing out that like the various relationships connected by the notation RT, similar relationships can also exist between the USE and USED FOR notations.

e.g.

(a) generality

ANTIAIRCRAFT GUNS *USE* GUNS
ANTINEUTRINOS *USE* ANTIPARTICLES
AQUEOUS SOLUTIONS *USE* SOLUTIONS

(b) specificity

ARC MELTING *USE* ELECTRIC ARC MELTING

(c) material

RIGID PAVEMENTS *USE* CONCRETE PAVEMENTS

(d) instrumental

SUPPLIERS *USE* SUPPLYING

The SEE and the SEE ALSO cross-references in the USAEC Subject Headings are also used in a similar manner.

Not all related terms can be slotted into types of relationship. Many just have to be simply accepted as being related to a greater or lesser extent.

e.g. GRAINS (FOOD) GRANTS
 RT GRASSES RT NASA PROGRAMS

4.2.3 *Control of word forms* Since all the Thesauri are in alphabetical order of keyword easy finding of many words with the same root is possible

e.g. WELD STRENGTH
 WELD TESTS
 WELDABILITY
 WELDED JOINTS
 WELDING
 WELDING MACHINES
 WELDS

However, where the direct form of entry is employed, for instance in the TAU, TEST, INIS, INSPEC and ASM Thesaurus, then other words such as ELECTRIC ARC WELDING, SPOT WELDING, FUSION WELDING will not be so readily found.

In SHE this is no problem since headings are inverted thus:

WELDING, ELECTRIC ARC, WELDING, ELECTRIC RESISTANCE

In other thesauri however the hierarchical structure does permit a certain measure of control, in that it allows other terms with the same root to be seen.

e.g. WELDING
 NT ARC WELDING
 ELECTRIC WELDING
 SPOT WELDING

A further method, as in the TAU and TEST, is the provision of a permuted index list which helps draw various roots and words together which would otherwise be separated.

e.g. LANDING
 AIRCRAFT LANDING AREAS
 BLIND LANDING
 CRASH LANDING
 DITCHING (LANDING)
 GLIDE PATH LANDING SYSTEMS
 HARD SPACECRAFT LANDING
 INSTRUMENT LANDING
 INSTRUMENT LANDING SYSTEMS
 LANDING AIDS
 LANDING GEAR
 LANDING LIGHTS
 RADAR LANDING CONTROL
 SOFT SPACECRAFT LANDING
 WATER LANDING
 WATER TAKEOFF AND LANDING AIRCRAFT.

4.3 *Precision devices*

4.3.1 *Coordination*. There are a large number of precoordinated terms in the thesauri for instance HELICOPTER ROTORS, FLUIDIC AMPLIFIERS, FEEDWATER HEATERS. In some cases single terms exist alongside e.g. HELICOPTER ROTORS, though if documents dealing with rotors of helicopters have been well indexed, i.e. under 'HELICOPTER ROTORS' at the searching stage the user should not retrieve documents on the subject as a result of intersecting HELICOPTERS and ROTORS.

There are instances of single terms in the thesauri which have to be combined to give the pre-coordinated concept, thus in TEST there is

FLUIDIC CIRCUITS *USE* FLUIDICS
CIRCUITS.

More often however these take the form of mixed pre- and postcoordinated terms.

e.g.

LIFE COEFFICIENTS *USE* AERODYNAMIC COEFFICIENTS
LIFT

HELICOPTER ALTITUDE INDICATORS *USE* ALTITUDE INDICATORS
HELICOPTERS

4.3.2 *Role indicators*. Role indicators are used to a limited extent in some of the thesauri by the addition of an extra distinguishing term or qualifier. Thus from TEST.

ARRESTING (PROCESS), CONDENSATION (PROCESS), CONDENSATION (MATERIAL), SHIPPING (PROCESS), STABILIZERS (AGENT)

and from the ASM thesaurus:

CAST PRODUCTS (FOR REMELTING)
CAST PRODUCTS (FOR REWORKING).

In some cases (and this could apply to the ASM terms above) the extra terms are not so much role indicators as qualifiers giving explanatory information to distinguish between homographs, concepts or use of the descriptor

e.g. HARDENING (MATERIALS)	HARDENING (SYSTEMS)
DOLPHINS (MAMMALS)	DOLPHINS (STRUCTURES)
STABILIZERS (AGENT)	STABILIZERS (FLUID DYNAMICS)
PLATES (STRUCTURAL MEMBERS)	
BRAKES (FOR ARRESTING MOTION).	

As a further stage, the addition of scope notes can also help define the role, use or limitations of a term.

e.g.

AUDIO FREQUENCIES

(NASA)

(approximately 20 to 20,000 HZ)

CORES (excludes magnetic and reactor cores)	(METADEX)
CORES (excludes magnetic cores)	(TEST)
CYCLONES (meteorological—excludes equipment)	(NASA)
LITHIUM ALLOYS (alloys in which lithium is a significant major constituent)	(METADEX)
LITHIUM CONTAINING ALLOYS (alloys in which lithium is a significant minor constituent)	(METADEX)
PRODUCTION (limited to industrial production)	(INSPEC)

5. Index language devices in the QUEST information retrieval system

5.1 Introduction

QUEST is an interactive information retrieval system, operated by the Information Retrieval Service of the European Space Agency, which allows the user to formulate simple or complex search requests via a video or hardcopy terminal which is linked to the IRS computer in Frascati, Italy.

To use QUEST the analyst enters simple command statements by depressing keys on the terminal keyboard. The computer responds instantaneously by displaying the various response data on the terminal.

There are four basic phases in the search expression.

- the selection of index terms
- the combination of these terms
- the display of results
- the modification of the search strategy

These four phases form an interactive loop.

In the first step, the analyst identifies and selects index terms using both controlled and uncontrolled vocabularies which relate to the search topic. The second step allows the user to build up his own specialized subject by forming logical equations based on Boolean Algebra. At each step the analyst is informed of the number of documents which fulfill his specified search criteria. The third step, display of output, allows the analyst to review references for relevancy and to select additional terms based on index terms found in displayed references to better express his search requirement (fourth step). This latter step is a feedback step which closes the loop.

5.1.1 The search vocabularies The index terms are selected from the search vocabulary. These are in fact terms taken from each of the databases in machine-readable form that are made available online by IRS.

Most of these databases contain records indexed using a controlled vocabulary—thesaurus or list of subject headings. Some also contain free index terms which usually do not exhibit signs of control. Both these types of terms are available

for searching in the QUEST system, as phrases or bound terms and also as single uniterms

In addition, other entry points are given such as words (uncontrolled) from the title and abstract, the corporate source, language, authors etc.

These access points are put in alphanumeric lists—inverted files—i.e. an alphabetical list of author names, another alphabetical list of languages, an alphanumeric list of words taken from the title, abstract and descriptor fields, and so on. These lists of terms can be displayed and the individual terms can be selected into the search strategy

The extent to which the index language devices described earlier are used in the QUEST system for the controlled and uncontrolled subject terms (as opposed to authors, languages, etc.) are discussed below.

5.2. Recall devices

5.2.1 Synonym control. The online inverted files for each database contain only postable terms, i.e. those which have actually been used for indexing. The synonymous terms (identified by USE and USED FOR) given in the printed thesauri do not appear in the online vocabulary. For example, a user searching in the NASA file online and entering the word HIJACKING will only see that the term is not used (since it has no postings). He is not given an indication, as he is in the printed version, that he should use the terms AIR PIRACY (the NASA file was recently reloaded as a free text file which meant that titles are searchable. Thus on looking up HIJACKING he would in fact find some postings—he would not know that these were only from titles and that the term was not a controlled descriptor. He might thus assume that that was all the information to be had on the subject, because again no SEE reference to AIR PIRACY is given).

The user is obliged, therefore, to constantly refer to the printed version of the thesaurus either before or during his search to pick up synonymous terms.

Differences in spelling i.e. between US and English can be catered for in QUEST by a character masking technique, thus words such as ORGANISATION and ORGANIZATION could be picked up on a single select command

5.2.2 Term linkage The QUEST system, through its Related Term feature, is capable of displaying term relationships.

Thus for the NASA and INSPEC databases, since the database suppliers make available tapes reflecting the structural relationships of the terms used in indexing, a display can be called up of the Broader, Narrower and Related terms. In addition the INSPEC structure also shows USE and USED FOR terms

This means, therefore, that a searcher can ask to see the Broader terms to e.g. 'Plasma arc welding' or more specific terms to 'Nimbus satellites'. In other words he can browse up and down the index term hierarchy at will.

For those files, which although having controlled descriptors assigned to them, do not make available a machine readable structural thesaurus, the structure of the NASA file has been superimposed. What this means in effect is that if a term in one of these files is exactly the same as a NASA term then the NASA relationship structure will

be assigned to it. The technique, though crude, is a relatively simple and efficient aid to searching these otherwise non-structured files.

However, a danger is that some databases may have, for example, more narrower terms than that of NASA. The additional non-NASA terms will, of course, not be given in the superimposed hierarchy, consequently the user will not be aware of their existence unless he checks the printed thesaurus.

5.2.3 Control of word forms. This device, the selection of terms with the same root pertinent to a request, can be done in four ways with RECON. Consider a question concerning 'polarization' in which some of the terms to be used are 'polarimeters', 'polarization' and 'polarized radiation'. Since the thesaurus can be displayed online, there exists immediately a visual control due to its alphabetical nature. Of the four methods for selecting the terms, two do in fact (like all good recall devices) reduce the size of the search vocabulary by reducing the number of sets.

Two of the methods allow the terms required to be selected individually—resulting in one set for each term chosen; while the other two permit the desired terms to be selected from the inverted file together in a range or group—resulting in just one set.

The latter two methods include the capability of right hand truncation (up to 999 terms with a given stem can be selected). Casual truncation can cause problems in some cases however. For instance in the example above if we truncate at 'polar' we get also information on the N and S Poles. If we truncate at 'polari', we still get information on 'polaris submarines', while if we truncate at 'polariz' we miss information on polarimeters.

A new feature has been recently introduced by IRS which helps overcome the above problem. The number of characters up to which the stem may be truncated may be specified. In addition it is also possible to specify only singulars and plurals (in fact this is the stem plus one character (e.g. ROCK and ROCKS)—thus plurals not ending in a simple S will be missed (e.g. PONY/PONIES) and other terms may be picked up (e.g. ROCKY)).

The use of character masking as an aid to controlling word forms can be used to advantage to pick up such singular/plural terms as WOMAN/WOMEN and 'synonymous' terms such as ORGANIZATION/ORGANISATION.

5.2.4 Clustering While automatic statistical relationships between index terms are not available with QUEST at the moment, there does exist a kind of half way house. This is made possible by the ability to display references and their keywords. The user is thus able to look at several references on the screen and can see whether the same index terms are used frequently in different references and which are used in combination.

5.2.5 Summation Another device for increasing recall is summation of document sets, where the presence of at least one of the descriptors contained in the index record is required in order for the document to be retrieved.

Basically this device is similar to that of synonym control in that the sets summed are usually equivalent concepts. Under QUEST, it is achieved by using the Boolean 'OR' i.e. also the same logic used in controlling word forms. For example, in a request

for information on 'pressure of fluids in pipes' a wide variety of terms could be used to augment the three basic terms. Thus for 'pipes', the user could include 'tubes', 'channels', 'ducts', etc.

The logic would then go something like:

(pressure *or* pressure measurement *or* pressure distribution *or*) *and* (fluids *or* liquids *or* water *or*) *and* (pipes *or* tubes *or* ducts *or*).

Since some concepts will overlap e.g. 'water pressure', separate equations must be built up

e.g. water pressure *and* (pipes *or* tubes *or* etc.)

Some of the different concepts are given below.

Terms	Concepts		
	Pressure	Fluids	Pipes
PRESSURE	✓		
PRESSURE DISTRIBUTION	✓		
PRESSURE MEASUREMENT	✓		
PRESSURE EFFECTS	✓		
PRESSURE GRADIENTS	✓		
WATER PRESSURE	✓	✓	
FLUID FLOW		✓	
WATER FLOW		✓	
CHANNEL FLOW		✓	✓
DUCTED FLOW		✓	✓
PIPE FLOW		✓	✓
PIPES (TUBES)			✓
TUBES			✓
DUCTS			✓
CIRCULAR CYLINDERS			✓
CHANNELS			✓
FLUIDS		✓	
LIQUIDS		✓	

5.3 Precision devices

5.3.1 Coordination. It is possible to use the Boolean logical AND with QUEST (for coordination or intersection). Any document sets can be intersected as is shown in the previous example i.e. 'pressure *and* fluids *and* pipes'. Care must be taken since being too precise (i.e. having too many intersected concepts) results in a loss of recall. Furthermore, there is a danger that some terms may include two or more concepts. (Again as in the previous example where 'water pressure' includes both the concept 'fluids' and the concept of 'pressure')

5.3.2 Links. Any false drops cannot be lessened by the use of links since they are not employed in the diverse indexing processes.

5.3.3 *Role indicators*. Role indicators would also be useful devices to make a search more precise. They are not available under QUEST except in so far as that descriptors which have qualifiers added, such as CONDENSATION (PROCESS), will appear in the alphabetical display of the inverted file.

5.3.4 *Weights*. A form of weighting is given, at least so far as the NASA TAU is concerned, in the index terms assigned to a document. Certain keywords in the record are used to make up the Notation of Content (NOC) or microabstract which follows the title (now renamed Title Extension) and these are asterisked by the indexer thus showing the degree of importance that particular concept has. It is the asterisked terms that appear in the subject index of the NASA abstract journal followed by the NOC. These asterisked terms appear in the QUEST online records, thus when displaying references the user can see at a glance whether or not the term he is interested in is a central concept in the document. It is possible to search on these asterisk terms and thus have a weighted search which should result, if the indexing has been done correctly, in a more precise result. (The asterisks are not given in the inverted file.)

Other databases also indicate the major terms in a similar manner (BIOSIS has three levels). Under QUEST it is possible to select either the major or minor terms or limit a set to them.

5.3.5 *Displaying*. Another useful precision device that is available in an interactive system is the ability to display references. The user can look at the complete document surrogate, index terms and abstract to see whether or not it meets his requirements. If it is suitable he can keep it, if not, he can reject it. In fact, as the index terms are also shown, this feature could also be a recall device since the user can be led to new index terms via the document display. Terms are certain to be in the index record which the user has not used either because he was not aware of them or simply because he forgot them. These terms can be added into the search strategy and thus retrieve hopefully more pertinent material.

6. Summary

The most common recall and precision devices have been reviewed and their use in a number of index languages or thesauri has been examined. The QUEST interactive information system was described in general terms and the extent to which the recall and precision devices are used in the QUEST system, in so far as controlled and uncontrolled subject terms are concerned, has been discussed.

Appendix—List of thesauri consulted

NASA Thesaurus (NASA SP-7C50). Vol. 1. *Alphabetical listing*, Vol. 2. *Access vocabulary*. NASA, 1976 (available NTIS).

Thesaurus of engineering and scientific terms. Engineers Joint Council, 1969.

Thesaurus of metallurgical terms. American Society for Metals, 2nd ed., 1976.

Subject headings used by the USAEC (TID-5001 (10th rev)) USAEC, 1971 (available NTIS).

Subject headings for engineering SHE. Engineering Index, Inc., 1972.

INIS Thesaurus (IAEA-INIS-13 (rev 7)). IAEA, 1974.

INSPEC Thesaurus. Institution of Electrical Engineers, 1979.

Information in industrial relations

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Introduction—the information need

EVERYONE UNDERSTANDS WHAT is meant by the term 'industrial relations' in a generalized way, but it seems that there is no formal definition which can be said to be universally agreed. Several alternative definitions are analyzed in A. I. March's *Dictionary of industrial relations*: Bain & Woolven in their *Bibliography of British industrial relations* say 'the subject of industrial relations is defined as the study of all aspects of job regulation—the process of making and administering the rules which regulate or control employment relationships'.¹ Perhaps a simpler definition which appears in an older work may be preferred: J. H. Richardson in his *Introduction to the study of industrial relations* says 'it is concerned with relations between the parties in industry, particularly with the determination of working conditions. No advantage would be gained in attempting a more precise definition of the boundaries, as there are considerable areas of "no man's land" with other subjects'.²

I draw attention to these definitions in order to emphasize the very wide boundaries of the subject. With that in mind, it becomes obvious that there is scarcely anyone in the UK who may not be expected, at some time or other, to have some need for information on some aspect of industrial relations. He may need information in his capacity as employee, as employer, as manager, or as trade union official. These are the primary users, but there are a host of secondary users—lawyers, officers of government departments, journalists, students, or ultimately the consumers, whose lives are affected by decisions about industrial relations. The very great increase in government intervention in industry and in industrial relations, and the commensurate increase in the powers and responsibilities of trade unions, combine to enlarge both the scope of the subject and its general application. The information user may need to know about benefits for industrial injuries, the properties of dangerous materials, dismissal procedures, the progress of a strike, the personnel of a union—the list is endless.

Having established that there is a large potential demand for information about industrial relations, where do people go in practice, to get it? I imagine that many of the people with the immediate practical need probably do not think about books or other printed sources in the first place. They go to workmates, shop stewards, and trade union officers, or, on the other side, to the employers' organization and the specialist legal services. It cannot be said too often, how important it is, and how difficult it is, to bring to the non-user an appreciation of the potentialities of information resources.

Growth of the literature

To the inquirer already conditioned to use printed sources, what is available? The literature of industrial relations is, naturally, a comparatively recent phenomenon. The first publication of any substance did not appear till 1860 (*Trade societies and strikes* by the National Association for the Promotion of Social Science). There was a steady trickle of publications in the first half of this century—academic, polemical, historical—but the rapid growth did not start till the 1960s and it is, of course, still accelerating vigorously, in all fields. The legal side of the subject has seen a particularly rapid expansion, caused, obviously enough, by the intervention of the law into so many aspects of employment: one might mention the various loose-leaf volumes, like *Croner's Health & Safety at Work* and Harvey on *Industrial relations and employment law* or specific textbooks like Peter Smith's *Industrial injuries benefits*, Michael Goodman's *Industrial tribunals procedure*, or Gernigan's *Tenure of trade union office*. Until quite recently basic directory material about the trade union movement and industrial relations was very limited: there was the Department of Employment's *Directory of employers' associations, trade unions, joint organisations etc.*, the *Directory of trades unions in the EEC* ed. by Michael Williams, and *Who's Who in Personnel administration and industrial relations*. This last title remains, I believe, the only one to contain biographical reference to trade union officials. More recently we have seen welcome additions in A. Marsh's *Trade union handbook*, which includes statistics, brief histories, the organization and personnel of the unions, and a unique bibliography of trade union histories; and A. P. Coldrick's *International directory of the trade union movement*. Polemical books and pamphlets, like Audrey Wise's *Women and the struggle for workers' control*, continue in their accustomed lively and tendentious manner. Trade union histories, too, are now being produced in a much more professional way. Most interestingly, there has been the appearance of several practical handbooks, written for a well defined market of practitioners in the field—I am thinking of series like the *Trade Union Industrial Studies and Practical Guides to Industrial Relations*. There has been a comparable growth in periodical literature, where there has been a similar shift of emphasis from the older, more academic, titles like *British Journal of Industrial Relations*, to the more down-to-earth and practical newcomers like *LRD Bargaining Report*, *Industrial Relations Briefing* or *Health & Safety in Industry*.

Organized information services

Public libraries have been rather slow to recognize and cater for this information need. In 1977 Roger Backhouse said in his article in the *Assistant Librarian* 'the needs of trade unionists, as trade unionists, are almost completely ignored by librarians'.³ Obviously many libraries do have more or less adequate coverage in some of the subject fields concerned, but little attempt has been made, in public libraries, to make contact with potential users, or to bring the material together in any coherent way. It is perhaps worth commenting that Dewey rather inhibits the organization of industrial relations material as part of a general library stock. Of course, public libraries are far from being the only providers of industrial relations information. There has certainly been considerable expansion of the information services of the trade unions themselves, although I detect a certain reluctance among trade union members to

approach this source. Is it possible, I wonder, that the charges of remoteness and inaccessibility, so often brought against the public library, could equally be made about other institutions? In any case trade unions' libraries are presumably research libraries for their own officers primarily. Many academic libraries, also, are valuable sources of information (Warwick University being particularly noteworthy). It is perhaps worth noting that four British universities now offer first degree courses in Industrial Relations. Then there are well-established specialist sources of information—I am thinking of institutions like Labour Research Department, Trade Union Research Unit, the TUC library, Marx Memorial library, others dealing with more specific parts of the subject field—Work Research Unit library, Health & Safety Commission library.

But there still seems to be a lack in this field and it is in response to a perceived need for accessible information sources at a strictly local level that other agencies have tried to establish small working collections of material. The great diversity of these organizations may be illustrated by the following examples—

Leeds Trade Union & Community Resource & Information Unit (TUCRIC)—described in a recent article in *Community Action*⁴

London Labour Library

North East Trade Union Studies Information Unit

'The Public Library' (London)—and finally two local institutions—Coventry Workshop and CHASM.

I would like to spend a little time examining Coventry Workshop. Although I make no claim that it is typical, it will serve as an example of certain trends. It is described as 'a labour and community research and advisory centre', and was established in 1975 in order to carry out research and advisory work within the local trade union, labour and community movement. Currently it has five full time staff, who were, until very recently, assisted by others on a STEP scheme. The staff collect and analyze information, arrange for specialist advice, organize discussions and courses, issue a bi-monthly bulletin and occasional pamphlets. The interests of the Workshop extend considerably further than industrial relations, including housing problems and women's rights. In the course of their investigations, a considerable quantity of publications has been amassed, including files of newspaper cuttings. It should be pointed out that 'this is an information resource for the staff of the Workshop in the first place. The staff are anxious to assist any inquirer who comes along, but it has to be recognized that the facilities of the Workshop are familiar only to people already fairly deeply engaged in the trade union or labour movement. The advice function is really the central purpose of the Coventry Workshop: if I may quote from their leaflet, they will arrange for groups to get advice from specialist workers 'who do not come in as outside experts but work as committed advisers with the groups concerned'.

To turn briefly to the second of our two Coventry organizations, CHASM is the rather striking acronym for Coventry Health and Safety Movement. (There are of course many similar bodies in other areas). This also is firstly an advice and discussion organization, which, as a by-product of its primary function, has an information collection.

Now that is a pretty casual survey of the organization of information resources in this field—it certainly does not claim any degree of completeness. I am not sure how

different this particular information scene is from the picture in other subject areas. the 'political' dimension does probably add a range of institutions not to be found in more technologically based subjects. Public libraries sometimes feel unnecessarily defensive about the existence of other, rival or complementary, information resources. I feel that this is largely unjustified—a multiplicity of information resources ought surely to be welcomed. However, it is significant that so many small local groups of trade unionists have thought it necessary to try to set up little collections of material, and it is probably true that not enough public libraries are offering any specialist services to trade unionists, nor buying enough of the material currently being published. I am sure that not enough public libraries are trying to reach the primary users in the field—but that is not unusual. It is a hopeful sign that a group of librarians is now being set up—the Trade Union Information Group.

Coventry's Tom Mann Centre for Trade Union and Labour Studies

In Coventry a very unusual opportunity arose to create a specialist section to meet the needs of trade union information users. In 1976 the City Council got together with the Tom Mann Memorial Fund to establish a trust, in order to set up a comprehensive collection of material connected with the trade union movement, as a memorial to Tom Mann, the Coventry born pioneer of the trade union movement this was done with the active encouragement of Jack Jones, at that time president of the TGWU. An initial donation of £1,200 was given by the Trust Fund and further donations have been made since: the City Council's contribution was to provide, through the Libraries, Arts and Museums Department, the space, the staff time, and all the necessary back-up services. It should perhaps be made clear that no extra staff or space were available. The new section was established in the existing reference library, which also houses an integrated stock in science, technology, business and law. The Centre was established in 1977 under the title Tom Mann Centre for Trade Union and Labour Studies: its brief was to set up comprehensive collections covering two topics—the Life and Times of Tom Mann; and Trade Union and Labour Studies. An Acquisitions Working Party was set up, with representatives from the library and from the Tom Mann Centre Trust Management Committee to work out in more detail the guidelines for an acquisitions policy. The aim from the beginning was an active working collection of trade union literature, with the core subjects fairly clearly defined, avoiding too much duplication of the more academic material available locally, notably at Warwick University library (The Modern Records Centre there has acquired in a short time a most valuable collection).

Using the terms of the Centre's title, we defined 'Labour Studies' to cover three broad topics, each with various subheads—

- (a) Industrial relations
 - (1) Worker militancy
 - (2) Worker participation and co-ownership in industry
 - (3) Bargaining
 - (4) Discrimination
 - (5) Industrial psychology

- (b) Law
 - (1) Factory law
 - (2) Labour law—worker's rights
 - (3) Trade Union law
 - (4) Impact of EEC
- (c) Worker in industry
 - (1) Economics
 - (i) Payments systems
 - (ii) Wages and incomes policies
 - (iii) Redundancy
 - (2) Unemployment
 - (3) Worker mobility and migration
 - (4) Employment conditions
 - (i) Safety and health
 - (ii) Injuries and compensation
 - (5) Training and retraining
 - (6) Management control systems

Under 'Trade Unions' we analyzed our subject field as follows—

- (a) History
 - (1) Development of Trade Unionism in the period of Tom Mann's lifetime
 - (2) Individuals
 - (3) Specific organizations
 - (4) Government and Trade Unions, including the Social Contract
 - (5) General
 - (6) Strikes
- (b) Organization
 - (1) Finance
 - (2) Membership
 - (3) Elections
 - (4) Law
- (c) Aims
 - (1) Policies
- (d) Personalities

Looking at these schedules in the light of subsequent experience, there are certainly changes which could be made: however it proved serviceable enough to form a framework for the development of the collection. We recognized that there was a peripheral subject, which we called 'The Worker in Society', dealing with the social and political position of the worker, in the context of the trade union movement.

It will be apparent that these schedules exclude the most overtly political subjects: it can obviously be argued that the relationship between the trade union movement and the Labour Party makes it difficult to exclude the development of the Labour Party and similarly that political doctrines are inexorably involved with the development of the trade union movement. The reason for this exclusion was a simple pragmatic recognition of the fact that these two subjects, both with very prolific

literatures, would make the collection too large for its very limited space, in a very short time. Obviously no very clear line can be drawn, and indeed it could be claimed that most, if not all the stock, has some political dimension. However in practice it has not been difficult to decide whether any particular item tended more towards the trade union or the political sides of the subject. It may also be pointed out that industrial relations in other countries do not form a part of the collection, although not specifically excluded.

Having analyzed the matter for the collection, we then looked at the forms of the material to be collected. Plainly periodicals and pamphlets would play an important part, and it was planned to include any available film or tape. Subsequently a newscuttings collection was started on the advice of the Acquisitions Working Party. One might wonder why such an archaic form of information retrieval should be chosen, but it was suggested that some of the users we most wanted to reach i.e. the local trade union officer and the active trade union member would find this more approachable than anything more sophisticated.

The aim has always been to produce a practical working collection, avoiding too much emphasis on academic material, and concentrating on the practical manual. As I have indicated we had a general picture of the kind of user to whom we hoped to provide a useful service (that is, the local trade union officer and the active trade union member, who, it was felt, were inadequately provided with information resources). In practice however, the situation of the Centre, in a busy multi-purpose library, makes it impossible to discern what proportion of the users fall into this category. Certainly it can be said that conversation with inquirers making specific requests for help from library staff does indicate that the Centre is reaching some at least of the clients it set out to help.

Briefly the practical steps taken to set up the Centre involved bringing together older material already on the library stock (basically a rather random set of elderly trade union histories and some older standard works, a handful of periodicals, partly political and partly practical, and a number of HMSO pamphlet series.) This older material has been absorbed into the new collection: it remains small enough; a matter of four bays of shelving, in a busy reference library which also holds an integrated stock collection in science, technology, business and law. The last two topics, i.e. business and law, provide invaluable back up to the Centre's work.

Information retrieval

Although it has been in some ways easy enough to find worthwhile material—easy in that there is plenty of it—there have been certain problems in locating the kind of material we most wanted to get. Much of it has proved not to be available through our usual channels (i.e. a book supplier's 'on approval' service) but has had to be sought for in various time-consuming ways.

There are certain general book publishers with an interest in the field—I might mention Allen & Unwin, Macmillan, Saxon House, or Croom Helm. Then there are the definitely specialist publishers—Pluto Press, Spokesman Books, Arrow Books—and a host of organizations and institutions; I will mention several that seem to crop up fairly regularly, but this is by no means to be considered a definitive list—Workers'

Educational Association, Labour Research Department, International Labour Office, Counter Information Services, Institute for Workers' Control, Incomes Data Services, National Council for Civil Liberties, Jim Conway Memorial Foundation, the TUC and the CBI. There are also certain more specialized organizations, like ROSPA, the Institute of Personnel Management, the Low Pay Unit, various government departments, and especially the Health & Safety Commission and the Department of Employment. These are all well known and well established, but there are other, more obscure and perhaps more ephemeral, imprints—like 'Spider Web' or 'Women's Voice'. The individual trade unions' own publications should not have been left to the last in this catalogue; they do present their own problems, not least because much significant material is unpublished or semi-published in the form of photocopied typescript, and there may also be problems of confidentiality.

The rapid growth and diversity of periodical literature matches that of monographs. According to the TUC library's recently published and very necessary '*List of current trade union periodicals*' there are about 135 titles now issued by trade unions, and most of these are not listed in any other source.

Commercial publications range from the expensive and academic titles like *British Journal of Industrial Relations* to very cheap news bulletins like *IRIS News* or *LRD Fact Service*. Some of these cheaply produced bulletins are particularly good for up to the minute information e.g. *LRD Fact Service* or in Coventry the *Coventry Workshop Bulletin*. The practical values of the IDS series of publications are too well known to need comment. New titles are being announced all the time—the WEA are about to launch *Trade Union Studies Journal*. *Pay and Benefits Bulletin* has recently been started by Industrial Relations Services.

With this wealth of information resources, it remains to look at the means of information retrieval available, and it is here that the field of industrial relations presents its greatest problems. Bibliographically speaking, the subject is not particularly well served, at least by comparison with science or technology based subjects.

Published bibliographies now include the monumental *Bibliography of British industrial relations*, by A. S. Bain and G. B. Woolven. Covering more limited fields, mention may be made of Maxine MacCafferty's *Employment relations in the UK*, Barrie Pettman's *Strikes: a selected bibliography*, Christine Rowat's *Worker participation: a bibliographic survey*, or the ILO's *Bibliography on major aspects of humanisation of work and the quality of working life*.

Turning to current material, only the WEA's *Guide to recently published material in industrial relations* attempts to cover the whole subject field. It lists newly published books and pamphlets, indexes a good range of periodicals, including trade union periodicals and others, and lists relevant government publications. It is, however, a quarterly publication, and does exclude quite significant material from its periodical coverage. Beyond the WEA Guide, the Work Research Unit's bibliographies are particularly valuable, although of course industrial relations is not the central topic. They produce *Information System Abstracts* and a series of individual subject bibliographies. The occupational health and safety side of the subject is well enough covered, at least at the technical level, by the various abstracting tools in medicine and chemistry. After that, as far as the UK is concerned, there is *ANBAR Abstracts*, covering quite a few likely titles; *British Humanities Index*, which indexes very few;

and *Research Index*, which, although it does not index any specifically industrial relations journals, does pick up a lot of interesting material from the dailies and weeklies. I should mention that there are some American abstracting journals—*Work Related Abstracts* and *Personnel Management Abstracts* primarily, also *PAIS* and *Business Periodicals Index*. Next month's *directories and new business books*, issued by Alan Armstrong, is a useful check for monograph material.

Conclusion

If I have seemed to labour the point about the difficulties of bibliographical control and information retrieval in industrial relations, it is because I want to emphasize the problem of access to information, and particularly in its relationship to public libraries. Whatever the defects of public libraries' provision of information in this field, they have a real strength in that they provide for most people the most immediate and accessible key to the information sources available. The user is not normally likely to get very much in the way of advice if he goes to his public library with a query about industrial relations, nor is he likely to meet open political commitment. For these things, I would suggest, the independent information unit, of the kind I described early in this lecture, is more suitable. What the user ought to get from his public library is professional expertise, in the exploitation of whatever material is immediately available, and in direction to other sources of information and advice: and impartial enthusiasm in locating information, for whatever end the user may require it

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Metallurgical information—past, present and future

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The role of the British Non-Ferrous Metals Research Association, the Zinc Development Association and related bodies in the development of non-ferrous information in Britain from the 1920s to the present day is viewed in relation to the information staff involved and the abstracting services provided. Future developments applicable to this field are viewed data services and video-disc storage, and their potential is considered

IN HONOURING THE life and work of Leslie Patrick it is not my aim to provide a complete review of the present state of metallurgical information. Instead I would like to concentrate on the non-ferrous metals industry that Leslie was concerned with for over thirty years, and look at a number of areas of special interest to myself, in particular the role of research associations, development associations and learned societies in the provision of information to the metallurgical industry.

Unlike many sciences, metallurgy has a well documented history going back well over a thousand years. Such was the metallurgical expertise of our ancestors that the development of our civilization is denoted by reference to the Bronze Age and the Iron Age. From these early beginnings man has constantly sought to improve his materials, for use in both war and peace, and yet has still to conquer problems caused by corrosion, fatigue, and wear. The effect of metals on the environment has been a major concern of the last few years and now, like any other resource won from the earth, we are facing a future where even the 'common' metals may become as precious as gold and silver. These developments have been mirrored by corresponding developments in the provision of information, although sometimes the time lag has been unacceptably long.

The First World War jolted the metallurgical industry out of a state of complacency brought on by centuries of pre-eminence. Sources of high-grade zinc for the production of brass cartridge cases almost dried up, and a shortage of tin gave rise to an increase in the use of cadmium, a metal of neglect for nearly seventy years. The War also brought home the metallurgical skills possessed by Germany. Soon after the War the Government set up the Department of Scientific and Industrial Research, and it was under the DSIR that the first Research Associations were established. It was in 1920 that the British Non-Ferrous Metals Research Association was founded, with Dr R.S. Hutton as its first Director, but with as yet no premises.

Hutton was a most remarkable man, and I commend his autobiography¹ to anyone interested in metallurgy and information. I would like to quote the following passage:

'When in 1920 I was appointed Director of the newly founded British Non-Ferrous Metals Research Association I realised the importance of developing its dual function. First and obviously, it had to plan the carrying out of investigations which would assist its industrial members both on short and long term problems, but secondly, and to my mind of almost equal importance, was the planning of a service which could provide members with information from worldwide sources.'

This awareness of the value of information was to have a major impact on the overall development of information services in the UK, and indeed the world, because Hutton and A. F. Ridley (the first Librarian at BNF) organized a conference in 1924 that led directly to the foundation of Aslib. Hutton was a keen supporter of Aslib, and became its President in 1942-1944. By 1928, when the first Aslib Directory was published, the only information services listed under Metals were BNF (at that time still in Birmingham), the Institute of Metals, and the Institution of Mining and Metallurgy. However, under Hutton's leadership things were soon to change. In February 1930 Ben Fullman was appointed to the post of Information Officer, probably one of the first posts of its type anywhere, and in September of the same year BNF moved to Euston Street, London. In 1934 Leslie Patrick joined as Librarian, and from that year until the present the pre-eminence of BNF's information service has never been in dispute. *BNF Abstracts* were established, and remained largely unchanged in format for forty years. Their coverage was wide and critical, largely due to the skills of Leslie Patrick and Ben Fullman.

To jump ahead of time for a moment, when I joined BNF in the summer of 1970 Ben had retired some seven years earlier. However he came in regularly to sit at the end table in the Library to compile an index to the BNF's vast array of research reports. I spent many hours listening to Ben tell of his work at BNF, of his translation of Hofmann's *Lead and Lead Alloys*, and of his Librarian colleagues Leslie Patrick and Bettina Walgrave (who herself only retired recently). I can still remember the cards in BNF's famous trade name index, many of which bore comments in Ben's immaculate script reflecting hours of patient detective work.

By 1934 Hutton had been appointed as the first Goldsmith's Professor of Metallurgy, University of Cambridge. This did not halt his crusading work in information and, in 1936, while in the USA, he was so impressed with the US approach to microfilm that he returned determined to obtain wider acceptance of microfilm in the UK. He would have been disappointed to see, even today, the resistance to microforms.

It was the late 1930's that saw the beginnings of the other organization that I want to bring into this paper, the Zinc Development Association. The rapid expansion of the building industry led to increased use of zinc and lead in building, and a small technical service was set up in Oxford to provide the building industry with advice and information. At about the same time the lead industry had established an advisory service on sheet and pipe usage, based in London. The strategic importance of zinc in wartime led to a rapid expansion of the Zinc Development Association, as it became, and increasingly ZDA acted as an intermediary between producers, users and Government. From the start ZDA produced an abstracts journal, at first duplicated

but, by 1942, printed. A comparison of the abstracts publications of ZDA and BNF highlights the differences between the organizations. ZDA concentrated on trade, legislation, new products and company profiles, whereas BNF covered metallography, the physics of metals, and mechanical properties. By the mid-1950's, the Lead Development Association had been set up, and by 1958 LDA itself was producing an abstracts journal, compiled by Bob Smith and Harry Wesson. Zinc and lead are found in the same ore-bodies, and by 1959 the two Associations had become ZDA/LDA, and were housed in the Association's present Berkeley Square offices.

At that time the Librarian of ZDA was John Blagden, and it was he who introduced an optical coincidence card system, and devised a very elegant thesaurus. Not only was the thesaurus used to index ZDA/LDA material, but the index words were issued to the associated zinc centres in the USA and Australia, to provide the basis for a local information retrieval service. However the system never really became fully operational, and by the time Len Taylor took over as Librarian in 1963 the card index was being gradually run down. However, the overall concept appealed to BNF, who were facing a major information retrieval problem. J. J. McGlynn had now taken over from Ben Fullman, and he introduced the use of 10,000 hole coincidence cards into BNF, using a thesaurus devised largely by Bettina Walgrave, BNF's Librarian, and using numerical roles based on the EJC Thesaurus. The BNF system operated well, with nearly 5,000 items being added each year, until computerization was introduced over ten years later.

Meanwhile back at ZDA Len Taylor inaugurated the ZDA/LDA translation service and the microfilm storage system. ZDA/LDA had always been short of space, and to solve the problem all the documents included in either Zinc Abstracts or Lead Abstracts were microfilmed, and printed out in answer to requests for the documents concerned. The success of this system induced Dr Terence Marsden, at the time in charge of CIDEAC (International Copper Development Council) at the South Audley Street offices of Copper Development Association, to start up a similar system.

As the metallurgical industry entered the 1970's the information services of BNF and ZDA had been responsible for the formation of Aslib (and thus indirectly the Institute of Information Scientists), the appointment of one of the first Information Officers in the UK, the adoption of optical coincidence card systems, and the use of microfilm as the basis of a library storage system. When I joined BNF/MRA in 1970 the provision of metals information in the UK had just been thoroughly researched by Brian Vickery and a team of consultants from Aslib, on behalf of OSTI.² In terms of data collection and analysis the report was remarkable in scope. However despite comments about duplication of coverage and the identification of apparent gaps in information provision, the report had little impact on the development of metallurgical information services. There were a number of reasons for this, but the primary ones were electronics, economics and the environment.

By 1970 BNF were already considering the ways in which computers could be applied to information retrieval, but at that time the computer hardware and software required to bring these outline plans to reality were still several years away. The economic situation was changing, in two ways. Firstly the Government support for Research Associations was to be withdrawn, and BNF and the other RA's would have to undertake a much greater proportion of contract research. This raised the problem

of how information services should be supported, as an overhead or chargeable to specific contracts. Secondly the general economic situation was changing, and industry was looking for ways to reduce costs by using alternative materials and by recycling a higher proportion of scrap. Finally there was the increasing realization of the potential hazard to health of the indiscriminate dumping and emission of metal wastes. The types of information asked of BNF and ZDA/LDA began to change, and the abstracts journals of both organizations began to cover environmental, economic and recycling subjects in greater depth than before. This inevitably caused an expansion of the number of abstracts published, and by the time BNF moved to Wantage and changed its name to the British Non-Ferrous Metals Technology Centre, in 1974/1975, plans for computerized production of the abstracts using the ICI ASSASSIN bureau service were well advanced.

By this time I had moved to ZDA/LDA where I undertook the integration of the abstracts production system (located on the third floor) with the operation of the library (located on the ground floor). The aim of Bridget Hayes, the Librarian, and myself was to set up a unit which could easily adapt to changing demands for different types of information. When enquirers, be they staff members, member companies or members of the public, seek information on a current topic, they do not want to find that the Library has not yet got round to covering that particular subject. A development association exists to promote the use of a material, and to defend existing markets, and must react quickly to economic and legislative pressures. As an illustration of this, the Library started to build up a collection of reports etc. on cadmium, especially its toxic properties. When in 1976 it was found necessary to start up a Cadmium Association under the aegis of ZDA, we already had a core of journals, books and reports, and were also in a position to start publishing Cadmium Abstracts within a few months of the Association being founded. That we were able to do this was largely due to the high value placed on the Library and Abstracts service by Ross Stubbs, Director General of ZDA/LDA, giving it a budget that enabled stock to be acquired, and staff recruited, at a time (1976-1977) when the overall economic situation was far from bright. It is all too easy to cut back libraries at such times, and impossible to rebuild them later to cope with new demands.

Whilst at ZDA I became interested in the use made of patents. BNF had always restricted their coverage of patents to British Patents, for which an enriched title was supplied. At ZDA some US Patents were included and, unlike BNF, were retrievable through the annual index. In late 1973 I attended the famous Aslib course on patents run by the late Felix Liebesny, and was introduced to the importance of patents as a source of information. I began to expand the coverage of patents, and became conscious of how much information they gave, in advance of general publication. The pioneering work of Felix Liebesny on this subject I found fascinating, and in 1977 was able to assist Elspeth Sutherland in her brilliant MSc thesis from City University, London, in which she examined the patent and journal coverage given to Bethlehem Steels' Galvalume coating. This is probably the definitive work on the subject. Considering the coating is a zinc-aluminium coating *Zinc Abstracts* did not emerge with flying colours! The rather complacent attitude of *Metals Abstracts* that anything of real merit would be published in the journal literature was demolished completely. However, *Metals Abstracts* still have virtually no patent coverage.³ As a

concession there are a few entries taken directly from the *US Official Gazette*, mainly in the sections on coatings, a subject given excellent patent coverage in *Metal Finishing Abstracts*. Interestingly the OSTI report made no reference to the need for, or availability of, patent information, a blindness also exhibited by the SDIM project of the European Communities. The *Système Documentation et Information Metallurgique* (SDIM) was designed to be the ultimate metallurgical information system. Its origins go back to a study carried out in 1970 for the EEC Commission which concluded that no more than half the estimated annual total of the world's metallurgical literature (about 50,000 items) was covered by any one secondary service. On 24 June 1971, the Council of Ministers adopted a Resolution calling for the establishment of SDIM and in March 1972 a Provisional Technical Agreement (PTA) was drafted. Implementation was rather slow. Each member of the EEC was responsible for a particular input into the system but by late 1973 only the German centre was providing any input. A second PTA was negotiated with all the EEC member states involved except Italy.

SDIM was originally intended to cover only the journal literature of both ferrous and non-ferrous metallurgy. A multi-lingual thesaurus (list of index words) was to be used to index the material and contained 7,250 entries. Output was to be in the form of magnetic tape, with microfiche records of the bibliographic information available if required. No printed version was foreseen. So far as the United Kingdom was concerned, the Department of Industry appointed The Metals Society as the United Kingdom contractor. They were to provide input to the system and make the output available to United Kingdom users. However, the best laid plans of DGXIII (the Directorate for Scientific and Technical Information) went sadly wrong. Only France, Germany and the United Kingdom were providing much in the way of input and this was difficult to retrieve due to indexing and general system problems, such as switching from IBM to Siemens computers. The incorporation of patents and other types of document was very much an afterthought and, in general, the entire SDIM concept was the victim of hasty planning. When the second PTA expired at the end of 1977, France and Germany decided to take over SDIM as a bilateral project. This must have come as a relief to The Metals Society who were faced with being agents for two large data bases (Metadex and SDIM) when there was obviously only room for one.

SDIM, or rather the UK reaction against it, provided a valuable stimulus for investigating the extent to which collaboration was possible between various metallurgical information services in the UK. The scope for cooperation and collaboration was outlined by Popper at the 1968 Conference of the Institute of Information Scientists at Sheffield, in which he felt that 'it might well prove advisable to build on existing facilities, rather than set up new ones'. Despite the reinforcement of this ideal in the OSTI report, nothing much happened. By late 1976 a number of information officers in the metals industry felt unhappy about the progress of SDIM, and decided to do something about it. The first meeting of the Metals Information Group (as it came to be called; MIG for short) was held at the BSC Head Office, London, under the chairmanship of Dr Alan Jones, Manager, Science Communications for BSC, with representation from GKN, Tube Investments, ZDA/LDA, Welding Institute and Steel Castings Trade and Research Association. Subsequently BNF and the Aluminium Federation joined. The first action was to sort out SDIM, but it soon became clear

that SDIM would fall apart without MIG help, and so the Group turned to other matters. The objectives of the Group were drawn up, and were as follows:

1. To coordinate activities between UK Metals Information producers/users, to improve services by the exchange of information and to reduce costs by avoiding duplication.
2. To cooperate in the joint exploitation of information acquired by Group members and to seek means of guaranteeing the long term viability of existing specialist metals databases.
3. To improve further the services available to users of metals information in the UK through negotiation with existing and prospective commercially-available databases.
4. To identify information gaps, both bibliographic and numeric, in the metals field and to suggest and coordinate studies and/or measures to overcome these.

Particular attention was paid to database compilation. By this time BNF were in the process of adapting the AERE STATUS software to run on Prime 300 minicomputer, and Welding Institute were using a bureau service to provide a computer-based retrieval service. BSC and Tube Investments Ltd. were using ASSASSIN, and GKN had their own in-house main-frame on which to base a novel SDI service. Accordingly a detailed analysis was made of journal coverage to see to what extent collaborative indexing and abstracting should take place. The Group also drew up a document outlining 'Information needs in the metals field', and on the basis of this document and discussions with John Gray, BLRDD, a Metals Information Review Committee (MIRC) was established, along the lines of other similar committees set up by BLRDD in chemistry, physics, biology, medicine and agriculture. The secretariat for this is based at the Metals Society, and is due to complete its work during 1981.

These Review Committees, whilst performing a useful 'think-tank' function, have at least two major disadvantages. Firstly, in the time taken to produce the final report, (usually over two years,) a number of information services or products may have either appeared or disappeared. Secondly, funding of projects falling within the remit of the Committee may tend to be postponed until the final report is available. MIRC organized a seminar in mid-1979 to which both users and providers were invited. The proceedings of this seminar will be available by early 1980 from the Metals Society. I for one am looking forward to seeing the results of the deliberations of the Committee at the earliest possible opportunity.

This brings the story of metallurgical information services very much up to the present day, and, having covered the past, and you yourselves know the present, let me look to the future. I have catalogued in a previous paper⁴ a few of the many gaps in the provision of information for the metals industry. I chose the title of the paper with care, since the metals industry requires access to a wide range of commercial information sources as well as to technological information. Most of what I said in that paper still stands, so I shall be selective in my look to the future.

There can be little doubt that online remote access to computer databanks has made a major impact on the information profession. I can still remember seeing my first online demonstration in 1975, and can remember the effect it had on all those present. However, online technology only gives faster access to a particular reference.

If the reference was never identified by the database compiler as being relevant, no amount of elegant software will subsequently find it. In this respect Metals Abstracts still has a long way to go. Few other major abstracts journals in any discipline can claim that their sections headings have remained unchanged since 1958. Apart from some cosmetic changes to the appearance of the abstracts (a benefit of computer phototype-setting) the coverage does not seem to have changed much. In view of the importance of an abstracting/database service to the development of the technology covered, it seems a pity that the opportunity has not been taken to revise the coverage of Metals Abstracts to reflect changes in the subject area. No doubt MIRC, under project leader John Vaughan of the Metals Society, will be studying the coverage of secondary services.

A recent and most welcome addition to the database arena has been Welding Abstracts, but there is still a lack of commercial information. If statistics on metal production are required then the only databases that are going to be of any help are those prepared by Predicasts Inc., who also produce printed versions of their database covering resources such as silver. However online databases are unlikely to be able to supply information such as suppliers of particular semi-finished products. This type of information has only a limited lifetime, and therefore must be quickly accessible, without the need for special interrogation skills. The answer could well be viewdata technology.

At the present time the UK public viewdata service, Prestel, is going through a difficult period. I myself have yet to be convinced that a public viewdata service is a commercial proposition, and feel that viewdata technology is best applied to the problem of small databases, for use either within companies, or by small groups of companies. Viewdata services need only a small computer, the data can be input directly from a keyboard with comparatively little skill (*once* the basic format and search algorithms have been established) and at little cost. Storage costs are low since no inverted files need to be set up, and the display equipment is cheap and easy to use. There would therefore seem to be considerable scope for a development association to set up a small database for use by members, giving trade names, supplier, prices, news on companies and personalities, times of meetings, etc. Such a system could be extended to Europe, as the new Prestel International service has been, since only public telephone lines are used. Member companies would then have information on price changes within minutes of them taking place, or be able to act immediately on new legislation. The high cost of printing and posting may make the viewdata package economically viable. Non-member companies could also be given access to part of the database, on payment of a suitable fee. Because it is easy to check on the number of times a particular frame is accessed it would be possible to modify the database content to achieve an optimum. A similar system could be run within a company to improve information dissemination between operating sites.

A further enhancement of such a service would be to strip off from a database such as Predicasts (with permission!) a selection of news items. This selection could be updated weekly or monthly. Key scientific articles could be treated in the same way. A company itself could also add data and information about its own activities, to give the executive and researcher information on his desk, when he needs it. The possibilities are, I feel, most exciting.

Another area of technology that could have considerable impact on metallurgical information is that of video disc technology.⁵ Few outside the metals industry realise the importance of diagrams and photographs, illustrating metallographic specimens, wear surfaces, corrosion products and new plant. All this information is lost on current computer systems, though of course some databanks can produce phase diagrams, even without a graph plotter. A videodisc can provide a video picture, in colour. This would enable libraries to have on file a complete set of phase diagrams of all metal systems on one 12 inch disc, such is the information density which can be achieved. At present video discs are a read-only device, but the search software already exists. To keep production costs down the discs have to be produced in quantity, but this should not inhibit their use. Information on the disc can be located using a simple numeric keypad, such as is currently used for Prestel. This gives an opportunity for video disc and viewdata technology to be combined, with the video signal being displayed on the screen of the viewdata set, and a copy being provided if required via printout devices already available. In the past the Research Associations and Development Associations have been leaders in introducing new technology, be it punched cards, microfilm or in-house online access. Here are some new opportunities.

Technology itself does not make for an effective information service. It must be harnessed and used by people. In the early part of this paper I deliberately mentioned many people by name, because it is through their efforts that we are where we are today. The RA's and DA's have always fulfilled a valuable role as training grounds for new recruits, who can then go out into industry with the experience so vital in information work. This is why the RA's in particular must support new information technology, so that it can eventually diffuse through the industry itself. I count myself extremely fortunate to have started out on an information career at BNF. The training I had there was of the highest order.

One of the pleasures of working at BNF and ZDA was the variety of the work; you never knew what the next telephone call would be about. However, often I was unable to help the enquirer; at BNF because it was, and still largely is, for members only; and at ZDA because as a free service we could not undertake long expensive literature searches when the usage of zinc and lead would be minimal as a result. I feel that there is a definite role here for the information broker, working closely with a client to cover a wide range of information problems, and being in a position to advise clients about improving their existing information services. In this respect it is interesting to note the rapid development of the Metals Information Service of the Metals Society over the last couple of years.

Metallurgical information has had a long and splendid history, is having an active present, and has a bright future. There are many problems to be overcome, but at least they are recognized, and progress is being made which should be stimulated by the forthcoming BLRDD report. The problems will be solved, but only by people dedicated to the task and experienced in both the metallurgical and information industries. Leslie Patrick was such a man. There have been others. I hope and trust there will be many more to come.

In conclusion I would like to place on record my thanks to all my former colleagues, without whose efforts, advice and friendship I would not be here today, and in particular at BNF—John McGlynn, Clive Mitchell, Brian Perry and Bettina Walgrave, at ZDA—Ross Stubbs, Frank Porter, Tony Chivers, Peter Gibbs and Bridget Hayes.

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AUTHOR'S NOTE

All the opinions expressed in this paper are my own, and not necessarily those of the organizations mentioned, or of Creative Strategies International

Psychology and librarianship—an appraisal of the potential of experimental psychology in the study of librarian-client behaviour

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The trend towards linking psychological research to problems of the librarian-client interface is discussed. A more vigorous, scientific approach to these problems is recommended, using the methodology of the experimental psychologist. This methodology is explained; an example experiment then demonstrates the effect of 'busyness' of library staff on the frequency of approach by users. Librarians may be disillusioned by the inability of psychological research to produce simple and final answers to complex questions, but the experimental approach demonstrated should be adopted as a method of establishing a scientifically valid literature of librarian-client behaviour.

1. Introduction

DISCIPLINES INCLUDING COMMUNICATION studies, linguistics, logic, mathematics, sociology, statistics, systems design, management, and computer science have been identified as relevant to librarianship.¹ Recently, calls for interdisciplinary research linked with psychology have come from eminent quarters of the information profession,^{2,3,4} and a number of papers have highlighted interpersonal aspects of the librarian-client interface.^{5,6,7,8} Yet such papers lack true interdisciplinary cross-fertilization, for they mainly draw on the literature of general, if not popularized, social psychology. Truly interdisciplinary studies between librarianship and psychology should draw rather on the methodology of the experimental psychologist. There are two reasons why existing interpersonal psychological treatments of librarianship are of questionable value and possibly even misleading.

The first reason concerns the short, superficial, and fairly ritualized nature of the librarian-client interface. It has been described as a 'fleeting encounter'⁹ and doesn't really bear the depth of examination afforded by equating the role of the librarian with that of the doctor, psychiatrist, or religious mentor.^{10,11,12,13} The second reason concerns a number of psychological phenomena which have been over-readily extrapolated to the library situation. For example, both Budd⁶ and Munoz⁸ mention the significance that eye gaze during conversation may hold for the librarian. This is a topic which has received extensive study in experimental psychology under headings such as visual interaction¹⁴, eye-contact¹⁵, gaze direction¹⁶, etc. Such studies do

generally indicate that inappropriate eye gaze will have a negative effect on face-to-face interactions. However, it is important to note that psychological experiments tend to be tailored to a specific set of experimental conditions containing variables which may cause the same phenomenon to appear differently from one experimental situation to another. For this reason, prediction of favourable gaze behaviour for librarians is more complex than might at first appear. To cite a few possible variables, there are differences between the gaze behaviour of men and women. Women engage in more eye-contact than men.¹⁴ There are inter-racial differences. It appears that black listeners look less into the face of speakers than white listeners do.¹⁷ It is probably also the case that excessive eye-contact will be perceived as threatening.¹⁸

So what then can the librarian expect to gain from collaboration with the psychologist? In order to answer this question, it is necessary to understand the scientific methodology of the psychologist, a process the lay person frequently misconstrues. As a science, psychology is still passing through an initial stage during which its findings are still fairly intelligible to the average person. As Miller observes¹⁹:

In order to stay alive among our fellow men, we must all be psychologists. Of course, survival requires us to be mathematicians, physicists, chemists and biologists, too, but there the distance has grown too great; no layman claims brotherhood without a prolonged initiation ritual conducted at some accredited university. It was not always so. There was a time when Everyman was a physicist, when Shakespeare would interrupt a play to argue against the heliocentric theory of the universe, just as a modern playwright may digress to illustrate or oppose some new psychological theory to-day.

Because psychology is still accessible to the man in the street, it is a common lay complaint that 'psychologists appear only to say in ridiculously long words what most people know already to be a fact of life'²⁰ But the educated guess or common-sense answer to a problem doesn't always correspond with the answer arrived at through scientific investigation (Any introductory psychology text will provide examples of such apparent inconsistencies. See, for instance, Mackay's account concerning the visiting of children in hospital by their parents.²¹) This is not to say that anecdotal observation, common-sense, intuition and other subjective techniques are of no value to the scientific process, for they can often be the stimulus to research

The exploration of a field of scientific knowledge by the anecdotal method is very generally a necessary preliminary to its conquest by adequate scientific methods of experiment and observation. Indeed its competent exploration in this way is an important step towards its final conquest, but this preliminary exploration must not be mistaken for completed work.²²

The central and essential feature of true experimental psychological research is the control and manipulation of variables that are related to the experimental outcome. The experimenter (1) changes or varies something, (2) keeps other conditions constant, and (3) looks for an effect of the change or variation upon the system he has under observation. The factor being experimentally studied, which the experimenter manipulates, is called the Independent or Experimental Variable. The system under obser-

vation, in which the results of this manipulation appear and are measured, is called the Dependent Variable.

2. The experiment

This section of the article will briefly summarize the methodology and results of an example experiment designed to test the hypothesis that a 'busy' library-staff will be approached less readily than staff who are 'not busy'.

(a) *Background to the experiment*

The problem of reluctance to approach library staff has been touched on by a number of surveys in the academic sector which have reported that of those students expressing reluctance, between 20 and 50 per cent gave the reason that the library staff were too busy.^{23,24,25} Suggestions that the solution to this problem may lie in a re-appraisal of traditional roles have come from the other side of the Atlantic. Swope²⁶ has complained that by their actions librarians are reinforcing the client's feeling that he is a nuisance, and has concluded that:

... if he (the librarian) is required to file a certain number of catalog cards, prepare book orders, or check invoices while manning the desk, he will never be able to change the image of the pre-occupied librarian.

More recently Hernon²⁷ reported that it was an often repeated comment that librarians seemed too busy and did not like to be bothered.

This study further found that:

... statements pertaining to the unwillingness to disturb or bother a busy librarian were numerous. A common complaint was: 'I hate to feel I'm putting someone out if that person is sitting behind a desk and is obviously busy.'

and concluded that:

... all activities and work carried out at the reference desk that might distract the librarian from giving full attention to reference requests or keep the patron from requesting assistance need examination and modification.

It appeared, therefore, that there was good justification for experimentally testing the hypothesis that 'busy' library staff are approached less often than 'not busy' staff.

(b) *Procedure*

The experiment was conducted in Edinburgh University Library between 6 to 17 November 1978.

The service point selected for the experiment was the Information Desk located on the ground floor. (See figure 1) This type of service-point's objectives are neatly defined in a paper by Harrelson.²⁸

The experimental period was broken down into ten pairs of three-hour sessions which were matched for possible differences between (a) the two Assistants who alternated manning the Information Desk, (b) days of the week, and (c) morning and afternoon sessions.

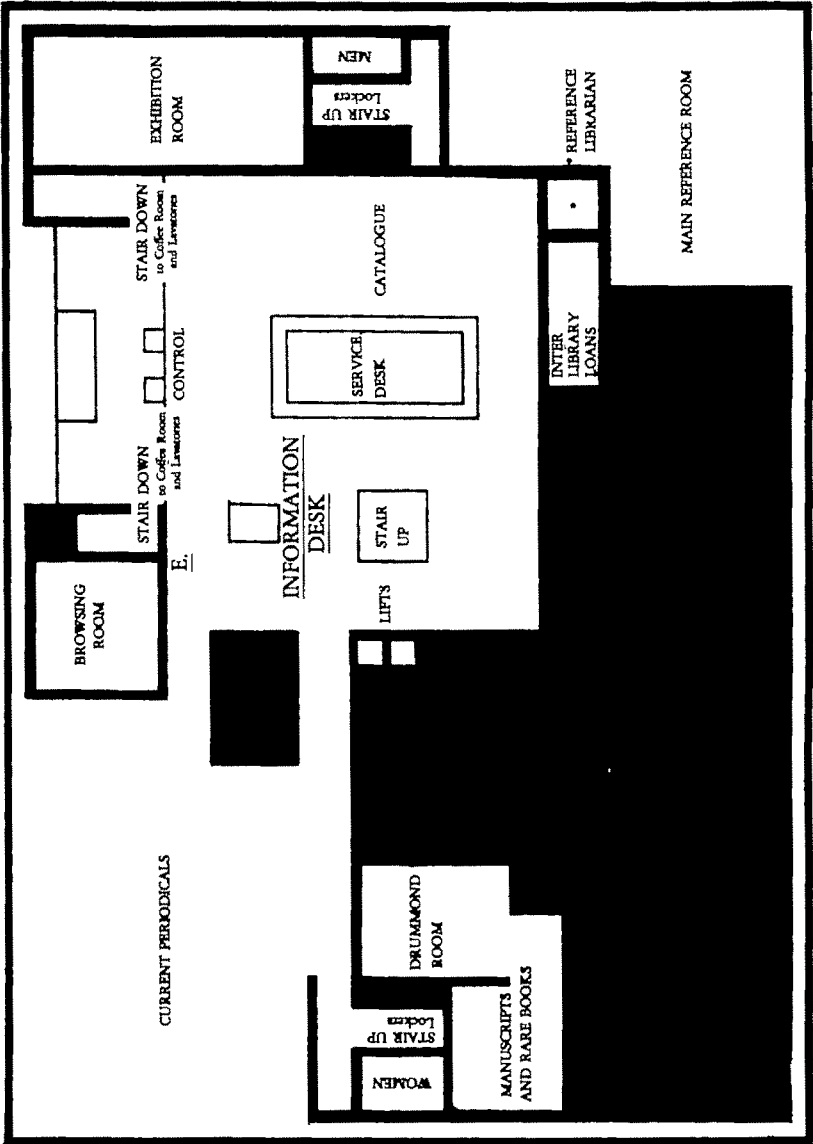


FIG. 1 Ground Floor Plan Edinburgh University Library, Main Library.

The independent, or experimental, variable was the apparent 'busyness' or 'not busyness' of the Information Desk Assistants, and presentation of this variable was given detailed attention. For 'not busy' sessions the Assistants had a minimum of work to do and the work-surface of the Information Desk was kept as clear as possible in order to minimize visible evidence of work. For 'busy' sessions ample work was available and was made physically evident. Some of this was genuine, e.g., cataloguing slips, processing to be checked, Information Desk record-book, etc. but there were also two bulky volumes and two notebooks which were purely 'props'. These were always placed on the Information Desk during 'busy' sessions and were always removed for 'not busy' sessions.

To give some validation of the perceived differences in the independent variable a set of six-point rating scales were completed by a sample of users. Interest was primarily in a 'busy—not busy' scale, with five other scales acting as blinds.

The dependent variable was the number of clients approaching the Information Desk during each session. The null hypothesis was that there would be no significant difference between the rate of approach during 'busy' and 'not busy' sessions.

Two other variables taken into account were, firstly, the number of clients using the library during any session—as reflected by turnstile readings—and, secondly, periods when the Information Desk was temporarily unmanned for any reason. Since these two variables were beyond control and likely to affect the dependent variable, records for each were maintained for each session to permit reworking of the basic data on the number of approaches. Recording was carried out by an experimenter seated fairly inconspicuously but within sight and earshot of the Information Desk. (At point E in figure 1.) The experimenter noted each consecutive approach, the time of the approach, the nature of the inquiry, and the sex of the inquirer. Verbal exchange was the criterion for defining a valid approach. Instances where subjects merely 'hovered' in the vicinity of the Information Desk were discounted. The experimenter also administered the six-point rating scales.

(c) Results

(It should be noted at this stage that substantially more detail and planning went into the design and administration of the experiment, and particularly into the analysis and tabulation of data than is possible to economically present here. Likewise, an amount of data regarding the nature of enquiries and clients has been obtained but is not being reported in this brief summary.)

Table 1 shows the rate of approach per hour over the ten matched pairs of experimental sessions during the two weeks of the study. Table 2 shows the data from Table 1 reworked in relation to turnstile records per session. (Unmanned periods during sessions were discounted, the remaining time per session being used for the approach-per-hour calculation. For turnstile data a mean figure was calculated for each pair of sessions and the approach-per-hour score adjusted as a function of deviation from this mean.)

The Standard Deviation of the signed differences between the pairs in Table 1 was 3.142 with a Student's *t* value of 3.693, while for Table 2 the Standard Deviation was 3.405 with a *t* value of 3.762. In both cases for a two-tailed test with nine degrees of

freedom the critical values of t at the 0.05 and 0.01 levels of confidence are 2.26 and 3.25, so the null hypothesis can be rejected at these levels.

	Busy condition	Not busy condition
M (AM)	5.128	6.829
M (PM)	7.605	12.414
TU (AM)	4.428	5.293
TU (PM)	6.315	8.889
W (AM)	2.474	6.900
W (PM)	5.738	14.286
TH (AM)	6.092	5.155
TH (PM)	6.667	10.000
F (AM)	4.026	6.486
F (PM)	3.088	11.995

TABLE 1 *Rate of approach (Clients per hour)*

	Busy condition	Not busy condition
M (AM)	5.107	6.849
M (PM)	7.753	12.179
TU (AM)	4.542	5.163
TU (PM)	6.297	8.916
W (AM)	2.253	7.648
W (PM)	5.752	14.249
TH (AM)	6.306	4.985
TH (PM)	5.574	12.440
F (AM)	3.942	6.626
F (PM)	3.073	12.052

TABLE 2 *Rate of approach adjusted in relation to turnstile data.*

Analysis of the data from the six-point rating scales along the 'busy—not busy' parameter confirmed a perceived difference in the independent variable in the direction predicted, though only to a 0.05 level of confidence

(d) Discussion

The data derived from the experiment encourage confident rejection of the null hypothesis that there is no difference between the number of times a 'busy' Information Desk Assistant will be approached, and the number of times a 'not busy' Information Desk Assistant will be approached. Furthermore, it is evident by inspection that the rate of approach during 'not busy' conditions was significantly higher than for 'busy' conditions.

The results from the rating scales are less emphatic, being significant only to a 0.05 level of confidence. It would, of course, be illogical that an experimental effect should be held to be present at a higher level of confidence than the independent variable to which that effect is attributed. However, discrepancy between, on the one hand, subjects' reports of their attitudes or predicted behaviour, and on the other hand, subjects' observed behaviour, is a common occurrence in the literature of psychology. In the present case this may point to the crudity of the rating scales used relative to the more sophisticated and extensive measures made in the observational study. The important lesson to be learned here is that dependence on rating scales, questionnaires, or other subjective measurement techniques without the support of observational data may provide an invalid and unreliable basis for the determination of how a person may behave. This is all the more important when one considers the proliferation of questionnaire and interview based user surveys, and the dearth of observational studies in library and information work.

3. Conclusion

It is possible that the approach this article proposes for future psychological research in library work may not be welcomed enthusiastically by librarians who may have been expecting more immediate and dramatic benefits from collaboration with the psychologist. The news that busy library staff are approached less often than staff who don't appear busy is unlikely to shake the library world to its foundations. Nevertheless, this is typical of the way the psychologist works. He doesn't 'know' what people are thinking, nor is he gifted with any mystical insight into human predicaments. In reality, the psychologist approaches problems by building up a framework of partial answers, often by seemingly disproportionately strenuous application of scientific methodology, uncovering small, specific, undramatic details which he hopes will eventually enable him to perceive the overall picture more clearly. As Wright²⁹ has observed:

It is characteristic of the scientific approach that it is piecemeal; one limited and localized problem is taken at a time. There is a preference for investigating aspects of behaviour in their simplest form first and thereby accumulating a body of knowledge from the standpoint of which more complex aspects can be tackled.

Yet even accepting Wright's counsel, it would only be natural for the experienced librarian to question the value of experimentally proving an effect, such as that busy librarians are approached less often, when that librarian may already have intuitively grasped and even applied this knowledge. Such a question would be answered in two, inter-related ways. Firstly, there is Legge's contention that:³⁰

... the bulk of psychological research should indeed be aimed at demonstration of 'what we already know'—but that it should be attempting to go one step further. It should be formalizing a picture of the underlying mechanisms so that we could train a Martian to be as skilful in interpreting human behaviour as ourselves. It is important to discover how we do the things that we know we can do.

It used to be a commonly ventured view that librarianship was an art, that good librarians were born, not made, and so on. This view represented a failure to formalize library processes sufficiently well that the ingredients of successful librarianship could be broken down, understood, and passed on to those less innately gifted.

The second part of the answer concerns the nature of scientific knowledge and has important implications for the eventual creation of a coherent literature of the psychology of librarianship.

It is well known that the subject matter of research must satisfy three criteria if it is to be accepted as scientific. Firstly, the events under study must be *empirical*, that is, capable of being observed or measured. Secondly, the events must be *public*. Scientific research has been described as the creation of 'public knowledge'.³¹ This means that the events must be capable of being observed or measured by others. Thirdly, the events must be *repeatable*, that is, capable of replication by other people who follow the same formula as the original demonstration. Unless experimental evidence conforms to these three conditions it is not competent to be used as a foundation for further work. For this reason, it is important that even these 'common-sense' phenomena should be validated by the application of sound scientific methodology. The intuitive knowledge of experienced librarians has an important part to

play as a stimulus to research, but unless this first level of knowledge is securely bedded in a foundation of universally acceptable scientific technique, it will prove impossible to proceed to the study of increasingly complex levels of library behaviour and so attain the ability to make predictions about such behaviour which will exceed the limitations of common-sense.

In conclusion, there is indeed considerable potential for applying the methodology of experimental psychology to the investigation of problems in library and information work. However, the nature of psychological research is not such that 'with a single bound' we shall be free of interpersonal and communication constraints on successful interaction with library users. Rather, this process must necessarily be gradual and fragmented. Those librarians who genuinely seek to advance the body of scientific knowledge about their profession must gird their loins and heed this final caution from Calfee³²

In the final analysis, questions and criticisms of any experimental proposal can be endless. You weigh the pros and cons of various decisions, then take your best shots, knowing full well that any single piece of research can provide but a glimpse into the complexities of a given research space. The gradual accumulation of empirical knowledge seems frustratingly slow in an era when we want 'now' answers to questions of broad social and psychological interest. The task of putting together the bits and pieces of research data resembles the assembly of a jigsaw puzzle with pieces missing. For those who prefer simple and final answers to complex questions, scientific research is frustrating and inconclusive. It demands patience and endurance from the type of person who delights in finding the 'blue piece with a little chunk of greenery and the barest edge of a red shirt' in a jigsaw puzzle.

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The databank of UK online users

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WHEN THE ROLE of the Online Information Centre was first under discussion one of the formal objectives decided for the Centre was the maintenance of a register of online users in the UK. After the Centre had been in existence for only a short while it became very obvious that a number of our enquirers required referral to personal contacts. Enquirers who were new to online felt there was a need for them to make contact with established users doing online searching in similar subject areas to themselves. Also, users often obtain their experience in a narrow range of databases, and do not have the required expertise to do a thorough search on an unfamiliar database. It was therefore considered that it would be beneficial for the users if they could be referred to an experienced user of the database they wished to search for the necessary details. This would be particularly useful where there is no formal representative for the database in this country, or where the enquirer wanted to obtain the views of actual users. The databank was therefore given high priority and questionnaires were sent out in July 1979.

When users begin to consider going online, they are often quite aware of the decisions that have to be made concerning which databases and hosts they need to access, but when deciding what equipment is required, the points that need to be considered are not always obvious. It is a part of an information officer's or librarian's training to be able to assess the tools of his work, but who in the past has guided him in the field of computer peripherals? The databank would put new users interested in one type of terminal in touch with searchers who were using this particular model. Comments made by users on their equipment have been recorded, and can be taken as impartial judgements on equipment quite anonymously if necessary. The staff of the Online Information Centre felt this was far better than making judgements on terminals purely from technical specifications and manufacturer's literature, as it is not possible for one or two people to gain adequate experience on all models of terminal suitable for online use. We have been unable to find publicly available qualitative reports on terminals, and so users' comments have been collected as a substitute, although this is by no means ideal, as users also have little experience on a number of terminals.

The information which has been obtained in compiling the databank does not represent a complete picture of the situation in the UK at a particular point in time. Nonetheless it is sufficiently interesting to suggest doing an analysis. However it must be remembered that most of the data presented was analyzed from only 343 questionnaires, which were returned from 491 sent out in July 1979, and at the time this represented the organizations then on the Centre's mailing list actually searching online or proposing to do so. This study was repeated in February 1980, when 222

further questionnaires were sent to organizations who have been added to the Centre's mailing list since July 1979. only a brief analysis has been included for the replies received.

Other surveys covering the spread of online searching have been done by Wanger (1976)¹ and by Anthony and Deunette (1978).² These two reports covered bibliographic services. A recent report by Houghton and Wisdom (1979)³ covers uses of non-bibliographic databases.

All the data contained in the databank is treated confidentially. Access is only made by the staff in the Centre, and no data is released unless prior permission has been given by the organization.

Data analysis

The information presented here was obtained from 343 questionnaires which were returned from 491 sent out in July 1979 in the mailing of *Online Notes* to organizations being users or potential users of online information retrieval. Each questionnaire represents one organizational unit i.e. separate department or site using online within one organization

General data

Number of questionnaires sent=491

Number of replies indexed=343 (69.86%)

Number of organizational units online=289 (84% of those returned)

289 is used as 100% for the analysis of data obtained from the survey. This data has been analyzed by question, and details are given below:

(i) *For which of the following are the online facilities within your department used?*

Literature searching—98.6%

Housekeeping (cataloguing)—11.4%

Fact retrieval from databanks—29.41%

Computation, modelling—6.22%

(ii) *What equipment do you use?*

(a) *Terminals*

Visual Display Unit (VDU)+Teletype Terminal—3.11%

VDU+Printer—25.26%

VDU alone—4.83%

Total no. of VDUs—33.21%

Total no. of Teletype terminals—68.86%

(b) *Telephone connection*

Acoustic coupler—41.18%

Modem—57.79%

No replies 1.03%

(iii) *To which systems does your department have access?*

Table 1 shows the percentages of organizational units which access the major bibliographic online databases. 26.99% of those online have access to BLAISE, Dialtech, Dialog and SDC, while 11.07% also include InfoLine.

TABLE 1 *Analysis of online host users (Percentages given where 100% = 289)*

	Total no users	No sole user	DIALTECH +	DIALOG +	SDC +	INFOLINE +
BLAISE	67.47	6.2	39.45	57.09	36.33	16.26
DIALTECH	57.44	5.1	—	48.1	31.49	14.5
DIALOG	79.24	4.8	—	—	44.3	16.96
SDC	46.71	1.38	—	—	—	17.3
INFOLINE	19.38	0	—	—	—	—

Of the other major hosts there were 3 users of BRS, 23 of New York Times and 1 of Scannet. Several users said they would be using Euronet/DIANE when it becomes available.

Table 2 gives a breakdown for each host by organizational type, and would suggest that the industrial/commercial sector is the largest single group of online users. It will be interesting to see when further surveys are returned whether or not this trend continues.

TABLE 2. *Analysis of online host users by organizational type (Percentages given where 100% = total no. of users for each host)*

Host (total no. of users)	Industrial/ Commercial	Academic	Government	Pub. Libs/Local Govt	Research/Prof Trade Assoc.
BLAISE (195)	39.5	31.3	15.4	9.2	4.6
DIALTECH (166)	48.2	24.1	13.3	5.4	9.0
DIALOG (229)	41.5	26.2	19.2	5.7	7.4
SDC (135)	57.0	18.5	9.6	5.9	8.9
INFOLINE (56)	69.6	8.9	8.9	5.4	7.1

Other online hosts accessed were: INIS and AGRIS (via IAEA), Interactive Sciences Corporation, Rapidata, Comshare, ADP Network Services, Data Resources Incorporated, DataSTREAM, Control Data and Prestel.

(iv) *Please specify which databases are searched frequently*

As there are over 300 online databases available they have been classified and analyzed in subject groups (See Table 3).

TABLE 3 *Subject analysis of databases searched frequently online*

Database	%
Agriculture Fisheries & Foods	18.69
Biology	30.1
Business	15.22
Chemistry	54.0
Earth Sciences	4.15
Education	10.38
Energy	5.19
Engineering, Construction & Aeronautics	49.4
Foundations+Grants	0.03
Humanities	0.6
Interdisciplinary	34.6
Management, Safety & Industrial Relations	5.8
Materials	19.0
Medicine & Pharmaceuticals	45.67
News	—
Nuclear Science & Physics	27.0
Patents	15.9
Politics, Government, Public Affairs & Law	0.03
Pollution & Environment	5.8
Social Sciences	11.6
Transportation	—

Several users did not specify which databases they searched, but included all databases of a particular host.

- (v) *Do you run any SDI (selective dissemination of information) profiles using online services?*

SDI was carried out by 31.49%

The next two questions can be considered together:

- (vi) *Are your on-line services available to users outside your organization?*

- (vii) *Do you charge for them directly?*

33.9% replied that online services were available for outside users and 25.6% charged for them. Some of the replies gave details of charging methods, and these ranged from fixed charges to actual costs incurred online. An analysis of charging is not given here, as the sample is not representative of all external online search services.

- (viii) *Are there any particular abstracting/indexing services not currently available online, which you would use if they were?*

There were 29 proposals for abstracting services to be made available online, which were suggested by more than one organization. The top five requests are listed below:

British Technology Index—16 requests

British Humanities Index—9 requests

CIS Index (Centre International d'Informations de Securite et
d'Hygiene du Travail (ILO, Geneva)

Analytical Abstracts

British Education Index

} 8 requests

Of the above list *British Education Index* is to be made available on BLAISE (1976 onwards), and *CIS Index* will be available on Spidel, a French Euronet/DIANE host.

(ix) *In your department who normally does the online searching?*

(a) The ultimate user—12

(b) Any trained member of the library/information staff—254

(c) (b) accompanied by/in the presence of the ultimate enquirer—180

(d) Other—7

Several respondents replied with more than one answer to the above question. This was mainly due to replies for both (b) and (c), where people commented that they preferred (c), but this was not always possible in their organization and it depended on attitudes of the ultimate user.

(x) *How have your searchers been trained?*

(a) In-house—35

(b) At courses run by online services suppliers—56

(c) At courses run by independent organizations—29

(d) Combination of (a) with (b) or (c)—169

Other—1

A more detailed study of training is being undertaken by Miss S. Keenan (Loughborough University) and Mrs A. Vickery (London University), who have been looking into the training requirements of intermediaries on behalf of the British Library Research and Development Department.

In the original questionnaire care was taken to define an online search. However, the follow-up questionnaires were sent out without this definition, and the answers to this question are therefore not included in the following analysis.

(xi) *Approximately how many online searches were made in your department in the last year? (Please indicate time period if you have been online for less than a year). For the purposes of this questionnaire, one search is defined as the use of one database on one system for one enquiry.*

211 (73%) of the respondents replied.

Average number of searches performed in a year = 307.6

Range of number of searches made in a year = 3500 to 5

19.4% of the 211 who replied carried out 500 or more searches over the past year. Where the number of searches performed was over a period of time less than one year, a simple extrapolation was performed to cover twelve months. This was only necessary in 24 cases.

One factor that has been highlighted by this question is that the meaning of an online search must be carefully defined, and steps should be taken to obtain a standard definition.

(xii) *Would you be willing to share your experience in the use of online systems with other librarian/information officers referred by the Online Information Centre?*

Yes, if consulted by the Centre in each case—37.37%

Yes, no prior consultation needed—52.94%

No, we do not wish to be contacted or identified under any circumstances—2.77%

Other—6.23%

The high percentage of users not needing to be consulted before referral of an enquirer has greatly enhanced the usefulness of the databank, and has allowed us to meet the enquirer's needs in a shorter time. However, as 90.31% are willing to share their experiences this suggests to us that the databank is considered useful by the contributors themselves.

Users were also asked to make any remarks about online they felt were important. Among the most frequent comments were:

Need for continuous practice

American bias of databases especially in management area

Problems when logging on through IPSS

Need for standardization of format for bibliographic references

Complexity of BLAISE searching.

If you also feel strongly about any of these points one way to voice your opinion is through your local or national online user group who are always glad to receive support for online problems, and with that support represent your opinions to the relevant authorities.

The responding organizations were also grouped into geographical regions, and the distribution of users throughout the UK is shown in Table 4.

TABLE 4. *Geographic distribution of responding organizational units*

Country	%
England	88.24
London	19.38
South East (excluding London)	31.14
South West	4.15
East	5.19
Midlands	9.69
North East	9.34
North West	9.34
Scotland	7.6
Wales	1.73
Ireland	2.42

As can easily be seen from these figures, the greatest concentration of users is in London and the South East (50.52%). This could be due to a number of factors including telecommunications costs, location of information units, or bias of our mailing list, but more investigation would be needed to explain the distribution.

Further results from February 1980 mailing of questionnaires

222 questionnaires were sent out and 78 had been returned by 31.3.80 of which 62 were established online users. This gives a total 351 online units who have contributed to our databank. The majority of the results remained within 10% of those given above. The results have been incorporated into the databank.

Conclusion

Since the Databank of UK Online Users has been compiled it has proved very useful for answering user orientated enquiries. We have been able to indicate charging policies of academic libraries, to put local users in touch with one another, to arrange for users to visit a local online unit to see online demonstrations and to find out about certain databases from experienced users, and to share experiences of online equipment, as well as other enquiries.

The survey has demonstrated to us that although there is a growing number of established online users there are many who have very little experience and those who are still evaluating online. We have not yet reached the stage where there are no more new online users as the Centre regularly receives enquiries from organizations considering getting started. The willingness of users to contribute to the databank has meant that we can more easily satisfy enquirers by providing personal contacts and we are grateful for their participation.

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THE EDUCATION OF USERS OF LIBRARY AND INFORMATION SERVICES:

an international bibliography, 1926-1976

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COLIN HARRIS
DAPHNE CLARK**

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Referral centres and services: a review

by

RUTH FINER

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Definitions; the principle, referral and technology.

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Referral systems in an international context

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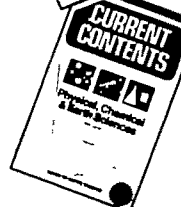
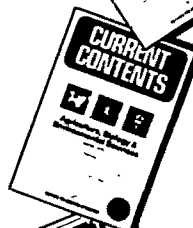
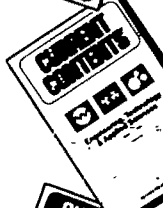
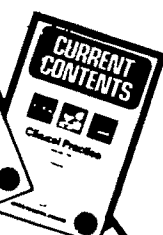
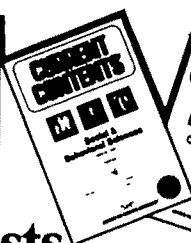
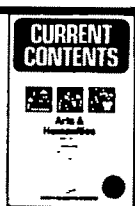
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OFFICIAL PUBLICATIONS OF THE EUROPEAN COMMUNITIES

Aslib Social Sciences Information Group Exchange of
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ASLIB PROCEEDINGS

Volume 32

September 1980

Number 9

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The range of official publications of the European Communities

Emma Harte

London Office of the European Communities

Paper presented at the Aslib Social Sciences Information Group Exchange of Experience seminar on the official publications of the European Communities, Aslib, London, 10 December 1979

The London Office

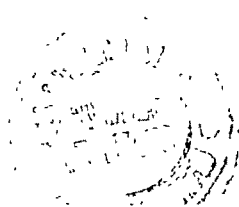
THE COMMISSION HAS offices throughout the world in such places as Venezuela, Japan, Canada, the USA, as well as in Europe, where besides the nine Member States there are also information offices in Spain, Portugal and Greece

These offices have been set up as part of the Commission's information service run by DG X in Brussels. As such they are responsible to DG X in the implementation of information programmes and policies. These policies are very often directed towards different interest groups, such as consumers, trade unions, women, schools and others. DG X also operates a visits programme and group visits from the UK are coordinated by the London Office.

The London Office has been in existence for over twenty years, it was moved from Chesham Street, SW1 in 1973 to its present offices in Kensington Palace Gardens. In the early days there were only three staff and this has been dramatically increased to 25 now. Besides the London Office, there are also smaller offices or antennae in Cardiff, Edinburgh and Belfast. There are seven senior staff in the London Office each of whom is responsible for certain policy areas, e.g. employment and social affairs, industrial policy, consumer and environmental affairs, and so on. These staff deal with the more technical queries concerning policy whilst inquiries of a more general nature are dealt with by the Data Room and Library staff.

The Data Room and Library provide a back-up service for inquiries both on the telephone and by letter, we also look after visitors wanting to do research or who are simply looking for general background material. The Data Room houses all documents received and they are arranged and classified under the UDC system. Obviously, it is vital that these files should be as up to date as possible.

The Library has a collection of the main Community publications and documents from the early fifties onwards—this includes *Official Journals*, general reports, and bulletins. It also contains a good selection of books on European Integration, political science, history and economics, as well as various periodicals on EC affairs both of a general nature and on more specific areas such as law. Both the Data Room files and books may be consulted in the library.



Community Publications

The range of Community publications is extraordinarily wide and it would be impractical to attempt to cover them all individually. I am therefore going to discuss a selection of them in order to give an idea of their type and range

General report on the activities of the European Communities, This is presented to the European Parliament each year by the President of the Commission. It provides a comprehensive record of Community activities for the preceding year. Simultaneously, the President submits the Commission's programme of activities for the forthcoming year. This gives a general idea of what is proposed for each policy.

Bulletin of the European Communities, This gives a monthly account in some detail of what has happened throughout a given month. The material is divided into policy areas and by institution and there is also a list of the latest Community publications included at the back.

Annual reports. Besides the *General Report on the activities of the European Communities*, there are also reports each year on social policy, competition, regional and agriculture. These are published as addenda to the *General Report*, and provide detailed accounts of what has been achieved in these sectors throughout the year. The *Agricultural situation in the Community* report includes a very useful statistical annex.

Studies series. These studies or reports are generally carried out by one or more experts on behalf of the Commission. They cover specific aspects of the main policy areas of competition, regional development, social affairs, commerce and education, etc., and very often provide the basis for future Commission draft proposals. For example, the Eileen Byrne report on *Equality of education and training for girls (10-18 years)*¹ will have been a valuable reference paper when the Commission draw up its Communication to the Council in this same area.

Information on Agriculture series; These are also written on behalf of the Commission by experts in the relevant field or fields and they deal with very specialised areas of agricultural affairs—such as *Marketing of imported fruit and vegetables in the European Community*² or *The Influence on health of different fats in food*³. Reports on *Evolution of concentration and competition* series in industry. These reports are carried out in the Member States on various fields of industry such as brewing, publishing, food distribution, cement, records and so on. They provide a detailed and technical account of the market situation in the industry concerned. A list of the reports is published each year in the annual *Report on Competition Policy*. The reports are published by the Directorate-General for Competition—one disadvantage about them is the fact that they are very often only published in the language of the country where the report was carried out.

Statistics; There is a large range of statistical publications all appearing under the series called *Eurostat*. These are colour-coded by series—yellow, red, green, etc. They cover a wide scope including such subjects as employment and social affairs, agriculture, external trade, transport, energy, national accounts and others. They are mainly annual but there are a number of monthly issues notably on energy, industry and unemployment. The annual booklet—*Basic Statistics*—gives a summary of the data published in the subject editions. The quarterly publication *European Economy*, though not in the *Eurostat* series, should also be mentioned here as it carries useful statistical data on national accounts, GDP, European Unit of Account, and so on.

There are three supplements published in conjunction with the quarterly *European Economy* which provide data on consumer prices and recent economic trends.

Official Journal: There are three different issues of the *Official Journal* published each day. These are the L series, the C series and the Supplement. The L series contains all Community legislation. The C series which is called Information and Notices contains proposals, European Parliament written questions, opinions of the Economic and Social Committee, summaries of European Court Judgements and the daily rate of the European Unit of Account. Finally the Supplement, S series, contains notices of invitations to tender for public works and public supply contracts both within the Community and in those countries which are members of the Lomé Convention. It also contains a monthly rate of the EUA against the currencies of the ACP countries and gives information on Community commitments for future projects in these countries under the European Development Fund programme.

These are just some of the official publications of the European Community. I hope I have managed to give you some idea of the scope and range of them. There are obviously many more and among these are the Scientific and Technical reports and the bibliographical publications, which will be discussed later.

Working documents of the Commission, that is COM documents, are made generally available only when they have reached final form; in other words, when the Commission has formally adopted them at one of its weekly meetings. At this point the COM document is forwarded to the Council and thence to the European Parliament and to the Economic and Social Committee. At the same time, these documents are made available to the Information Offices—we receive a certain stock which we then distribute on request. Until that stage they are formally available only to the Commission staff concerned, to national experts and Government Departments who are consulted in drawing up the documents.

European Documentation Centres are entitled to receive all these publications and documents. They will generally receive as a matter of course the *Official Journal*, the *General Report*, the monthly *Bulletin* and the COM documents. However, specific requests will have to be made to Brussels in order to receive other reports, statistics, etc. As far as the COM documents are concerned, a selection of the most important of these is made and distributed approximately every six to eight weeks. DG XII in Brussels is responsible for the European Documentation Centres and obviously we in the London Office will help wherever possible.

Finally I will briefly discuss the publications of the European Parliament and the Court of Justice. The European Parliament has an office also at our address where there is a small staff of nine. Main publications are the EP debates which are published in the *Annex* to the *Official Journal* and are available from the Publications Office in Luxembourg on subscription. *European Parliament Working Documents*, i.e. Committee reports, are also obtainable on subscription from Luxembourg, though individual copies may be obtained from the London Office. The London Office also offers a certain number of free publications on the European Parliament.

The publications of the Court of Justice are listed annually in the *Synopsis of the Work of the Court*. Judgements and Opinions are published in *Reports of Cases before the Court* but it is also possible to receive offset copies of these from the Court for a small charge. There is a weekly summary of the *Proceedings of the Court* which is useful for keeping up to date with cases before the Court, and also a quarterly

bulletin—*Information on the Court of Justice of the European Communities*. Both the latter publications are available free of charge directly from the Court in Luxembourg.

All the publications which I have discussed are listed in the annual publication *The European Community as a Publisher: Extracts from the Catalogue of Publications*. This is available free of charge from the London Office of the Commission

REFERENCES

- 1 *Studies*, Education series 9 1979
- 2 *Information on Agriculture* series 27 1976
- 3 *Information on Agriculture* series 40 1977

Parliamentary scrutiny of European Community business

John Guy

Foreign and Commonwealth Office

Paper presented at the Aslib Social Sciences Information Group exchange of experience seminar on the official publications of the European Communities, Aslib, London, 10 December 1979

Introduction

THE RANGE OF COMMUNITY publications and documents available from the Information Office and other sources, including HMSO, has already been discussed, so I shall confine myself to a brief examination of a group of documents known as Council documents. I shall do so in the context of the scrutiny by the United Kingdom Parliament of Community business. I propose to begin, therefore, by describing the scrutiny procedure.

The Scrutiny Procedure

It was recognized at the outset of the negotiations on UK accession to the Community that accession would involve unique changes to United Kingdom sovereignty. The basic Community treaties transferred to Community Institutions certain treaty-making and law-making functions which had hitherto been exercised by Government and Parliament. The doctrine of the supremacy of Community law had been established and while national courts then had and still retain first responsibility for enforcement, the final arbiter of Community law is the Court of Justice of the European Communities in Luxembourg. Judgements and rulings of the European Court and the evolution of the Court's jurisprudence have an important impact on Community law. All of this contributed to concern about how United Kingdom interests could be properly protected once the United Kingdom became a full member of the Community and subject to the panoply of laws flowing from the basic Community treaties. The problem is at its most acute paradoxically not in those areas where the power to legislate was delegated entirely to the Commission. In the majority of cases, this type of legislation is akin to domestic acts of an administrative character. This is not to say that Parliament raised no objection. There was strong resistance to the idea of legislative functions being delegated to Brussels without any corresponding involvement of Parliament. This still causes concern. But the area which gave rise to greatest concern both within and without Parliament was the power to make new law vested in the Council of Ministers. Much of the law which emerges from the Council is directly applicable in the Member States and binding in its entirety. Moreover, the new law is created by negotiation among Ministers on proposals put forward by the

Commission. Thus, it resembles international treaties and agreements in form, over which Parliament has a degree of influence, but it is more akin to domestic legislation in effect. There is no provision in the Community treaties for ratification by national parliaments nor are national parliaments given any formal consultative role in the law-making process.

Of course, Ministers remain accountable to Parliament for their actions in Brussels as they are elsewhere. But Ministerial accountability to Parliament could scarcely be credible in the absence of some formal arrangements to ensure that an adequate flow of information about proposed new legislation was provided to Parliament at the earliest possible opportunity in the process. In practice, this must be made available to Parliament before serious negotiations on proposals begin in the Council. Thus Select Committees of both Houses of Parliament were appointed in 1974 to scrutinize proposals for new Community legislation as soon as they are submitted by the Commission to the Council of Ministers. The object of the exercise is to ensure that Parliament can consider draft Community law and, through debate and Parliamentary questions, express its views to the Minister responsible for conducting negotiations in Brussels.

The procedure is simple. English texts of all proposals submitted to the Council of Ministers for legislation (and since December, 1976 some policy documents) are deposited with the two Scrutiny Committees by the Foreign and Commonwealth Office. The Committees are also entitled by their terms of reference to see published documents which are submitted to the European Council. In the case of draft legislation, texts must be deposited within 48 hours of receipt in London.

The procedure for handling documents within the Scrutiny Committees differs, reflecting differences in the respective terms of reference of the Committees and the different nature and preoccupations of the two Houses of Parliament. In the Commons the Scrutiny Committee comprises 16 members. It meets weekly on Wednesdays at 4 pm. It aims to examine all documents and makes recommendations on them with the least possible delay. However, the Committee will not consider a document until the responsible Government Department has submitted an Explanatory Memorandum on the document. An Explanatory Memorandum contains a brief analysis of the document which includes general background, the Council timetable, a note on the Treaty basis for any proposed action and a note on the legal and policy implications of the proposal. The Committee has a team of advisers who also prepare advice which is submitted to the Committee after receipt of the Explanatory Memorandum from the lead Government Department. The reason for this is that the Committee is essentially a sifting Committee comprised of lay members whose task is to single out legally and/or politically important documents so that they can be considered (debated) by the House of Commons as a whole. It does not consider the merits of proposals, only the House may do that in debate. The Committee issues a weekly report which usually contains at least one recommendation for a debate. The debate is the vehicle for the expression of the views of Parliament to the responsible Minister. The present Government, like its predecessor, does not normally agree to new legislation in Brussels until the scrutiny procedures have been completed.

Procedure in the Lords is markedly different. The whole Committee comprises 24 members. There are 7 expert sub-committees specializing in Finance, Economics and Regional policy, Trade and Treaties, Education, Employment and Social Affairs,

Agriculture and Consumer Affairs, Law, Energy, Transport and Research; and Environment.

The Chairman, assisted by the Clerk to the Committee, conducts a sift of newly deposited documents to consider whether further scrutiny by the appropriate expert sub committee is required or whether the document can be dismissed as of no importance. The Chairman's sift results in a fortnightly report by the Committee. Documents remitted to the sub committees are further sifted and some are often the subject of prolonged investigation and may result in comprehensive, 'in depth' reports by the Committee to the House. It will be seen that the Lords Committee acts as a surrogate with full powers for the House of Lords in a way which is not matched in the Commons procedure. Reports by the Lords Committee are not always debated. But that does not diminish their importance.

Normally, the Scrutiny Committees will examine a document once only. Similarly, there is only one debate on a document where this is recommended, although if a document is amended, it may be recommended for a further debate. Ministers usually make statements to Parliament on the outcome of the Council meetings. In this way, Parliament is able to monitor the effectiveness or otherwise of the scrutiny process.

Numbering and Circulation of Documents

The Council Secretariat is the main channel of communication between the Communities institutions and national Governments. Documents submitted to the Council for consideration by Ministers, whatever their provenance, are circulated in their original form as Council documents with a covering document, attached by the Council Secretariat, which bears a Council reference number and classification. The Council covering document may be a substantive document in itself. Or it may simply be a short courtesy letter from the General Secretary of the Council to the President of the Council or alternatively, from the President of the Council to his Ministerial colleagues. From the moment that documents begin to circulate within the framework of the Council, they are known only by the Council reference number and classification. This practice is continued at national level so that Government Departments record and file documents according to the Council Secretariat numbering and classification given to the document. The same is true of Parliament. There are a few exceptions to this arrangement in the context of Parliamentary scrutiny, where for example, it is necessary for Parliamentary/Council time constraints to submit an advance copy of a Commission proposal for legislation for scrutiny before it has formally circulated within the Council framework. On such occasions, documents will be commonly referred to by the reference allocated to the document by the originating institution, usually the Commission.

Until the end of 1978, Council documents were circulated under five numerical series. Four were prefixed with the letters R, S, I and T. A fifth bore no prefix. The paper on which the document was printed was colour coded to aid identification of the series. The prefix signified the degree of openness of the document and originally determined the circulation a document might receive. Documents in the simple numbered series contained no sensitive information and could be circulated freely. Those in the R series were intended to have a restricted circulation since they generally related to matters which, although not sensitive or classified in any way, were nevertheless still at the discussion stage within the Community. Documents in the S

and I series were not generally regarded as being suitable for publication. Those in the T series were internal working documents, usually reports of discussions in the various Council working groups and were given a very restricted circulation, even within the Council framework. Generally speaking, only documents in the R series were deposited in Parliament, although the system degenerated in later years and documents in the S series came increasingly to be deposited. In addition to the numerical series, the Council Secretariat used other sub-systems to classify documents in order to denote the institutional framework for the circulation of documents. These sub-systems enabled the Council Secretariat and recipients of documents to discriminate between documents in circulations.

The system dated from 1957. Since then Community activity has expanded into new fields and existing activities have become increasingly specialized. The old arrangement were inflexible and became totally inadequate despite significant changes in 1961. The Council Secretariat therefore introduced a new system for the numbering and distribution of documents on 1 January 1979.

The new system incorporates many of the basic principles of its predecessor. However, coloured paper for Council Documents and the use of prefixes in the serial number have been abandoned. A single numerical series has been adopted. But to aid identification of the Institutional Framework (the most common of which is the Council itself) within which a document will circulate, an identifying abbreviation and a block of numbers has been allocated to each framework. It is expected that the numbers will be revised annually. New allocations should be announced by the Council Secretariat in December each year.

Documents are further differentiated according to a number of other criteria; the most important of which are.

- (a) confidentiality—this is clearly specified on the front of the document,
- (b) subject matter or point of interest—the Council Secretariat, in consultation with the Member States, has devised an expanded set of subject classifications which are also marked on the form to the document used to identify the subject of a document when the Institutional Framework is insufficient for this purpose. Once again, the classifications used are abbreviations of the French code word for the subject matter. These classifications are used to define points of interest within four of the Institutional Frameworks mentioned earlier. These are.
 - (a) the Council,
 - (b) Conference of Representatives of the Governments of the Member States;
 - (c) European Co-operation Projects in the field of Scientific and Technical Research,
 - (d) Community Patent Interim Committee

The remaining Institutional Frameworks are thought to give a sufficiently precise indication of the subject matter of a document.

- (c) status of the document—it is important that readers of documents should be able to decide quickly whether they are dealing with a draft, a revised draft, a corrigendum etc. The status of the document is indicated by means of suffixes to the main serial number on the cover of the document.

The new system for numbering and distributing documents is claimed to be a great improvement over its predecessor. It is certainly true that it offers recipients of Council documents the opportunity to control the kinds of material which they receive much more closely than in the past. The system appears to be flexible enough in theory to permit development without degeneration. In the long run, this flexibility should lead to substantial cost reductions. But clearly, the success of the system in reducing cost and the distribution of unwanted documents will be heavily dependent on the degree of discipline exercised by recipient Departments. In practice, it is probably true to say that the Council Secretariat, as originators and distributors of documents, derives greatest benefit from the new arrangements. As far as users are concerned, it is enough to know the number of a document to identify it. Certainly, the storage of documents in Government Departments is founded entirely on this. The other requirements are to all intents redundant, except when compiling, and reviewing lists of requirements for the Council Secretariat.

Documents submitted to the Council are distributed to a wide range of Government Departments by the Council Secretariat according to a list of requirements submitted by the Foreign and Commonwealth Office. European Integration Department (Internal) in the Foreign and Commonwealth Office and the European Secretariat in the Cabinet Office receive copies of all Council documents. European Integration Department receives all documents because it is the depositing department and because it shares a general co-ordinating role in relation to the European Community responsibilities of other Whitehall Departments with the European Secretariat of the Cabinet Office. Although the responsibility for the deposit of documents in Parliament rests with the Foreign and Commonwealth Office, the responsibility for the deposit of the appropriate Explanatory Memorandum remains with the lead Whitehall Department.

The Parliamentary scrutiny procedure is the Government's main formal channel of communication about Community affairs with the public. Documents deposited in Parliament are not available to the general public from the Foreign and Commonwealth Office. There is a simply practical reason for this, the FCO does not have the resources to supply documents on demand. However, to assist the public to follow European business more closely, lists of documents deposited in Parliament are published regularly in the *London Gazette* and in the Department of Trade's weekly magazine *Trade and Industry*, now *British Business*. Documents are available direct from the Community's Information Offices here in London. But since the Communities Information Office library does not receive Council covering documents, lists published in the way I have described include the reference of the originator of the substantive document attached to it. Since the majority of these originate in the Commission, this is usually a Commission reference number—or COM number.

This summarizes the formal position. Of course, this is a bureaucrat's eye view. It reflects the fact that the Government's first responsibility in the provision of information about Community business is towards Parliament. Of course there are parallel informal procedures. As one might expect in a pluralistic system like ours, a network of informal contacts for consultations was quickly established after United Kingdom accession among Government Departments, Parliament, industry and interest groups. The Lords Committee regularly takes evidence from experts, from Ministers and officials. The Commons do so less frequently. No Government Department would feel confident of doing business in the Community if it had not first carried out

consultations on proposals/documents with its constituents in the general public, industry, the TUC, or whatever, so the flow of information is considerable despite appearances to the contrary.

Problems of bibliographic control: The main bibliographic sources and publications catalogues

John Jeffries

University of Kent at Canterbury

Paper presented at the Aslib Social Sciences Information Group exchange of experience seminar on the official publications of the European Communities, Aslib, London, 10 December 1979.

A BIBLIOGRAPHIC ESSAY on all the sources which one might refer to for European Communities' publications is beyond the scope of this paper, and I have also some mental reservations about how I might organise the topic in order to suggest possible search strategies. One way might be to consider the categories of documents which emerge from the Institutions of the European Communities

- 1 Works which are printed by the Official Publications Office in Luxembourg¹ and which are on sale at HMSO in the United Kingdom.
- 2 Works which are printed but which are distributed gratis.
- 3 Limited distribution documents, generally cyclostyled in format, and which are sent only to those on a distribution list

I suppose also that I should include those books which are handled by commercial publishers on behalf of the Commission of the European Communities.

The Official Publications Office was once alleged to have a printing and publishing monopoly. But, on 5 April 1979 it was stated in the *Official Journal* that

'The Commission has decided that its departments should make use, whenever appropriate, of the services of private publishers for their publishing requirements.'²

The notice goes on to say that:

'The publications in question deal mainly with the following fields: coal research, steel research, energy (scientific, technical and economic aspects), nuclear science and technology, biology, medicine, agricultural science and technology, environment and quality of life (scientific, technical and technico-economic aspects), radiation protection, industrial medicine hygiene and safety, information science. There are also possibilities in the following fields: law, education, taxation, transport.'

Now, it happens that DG XIII has been using commercial publishers for a number of years. They were certainly doing so in 1975 and possibly earlier. The justification is quite simple. It is held that it is more efficient to use the services of those who are experts in the dissemination of specialised information, especially to a small specialist audience, than to rely on blanket free distribution. This is possibly the reason for the

decision not to distribute scientific literature to European Documentation Centres. In the past there was not necessarily a problem of bibliographic control, with these works published commercially, because they were all listed in *Euro abstracts*. If the full range of topics mentioned in the *Official Journal* are taken by commercial publishers then it is not clear to me whether one can continue to rely on *Euro abstracts* because some of these subjects are apparently outside its present scope. And, of course, the works affected will not automatically be received by European Documentation Centres. So, it would seem that at the moment bibliographic control in this area is acceptable but may not necessarily remain so. I think that one can draw parallels with the confusion over what is or is not HMSO in this country which Eve Johansson has already described.³

To return to my first category of works printed by the Official Publications Office and on sale in this country at HMSO. The HMSO bibliography itself ought to be adequate for most needs. There is a regular section of the *Daily list* which details the material sold but not published by HMSO with which one can keep up to date. Entries for these documents should then appear in the monthly catalogues and cumulate into the annual, *International organisations publications*. One of the problems is that the *Daily list* entries are produced very much on a common sense basis and the subsequent entries according to the *Anglo-American Cataloguing Rules*. Up to 1975 the entries for the publications of international organisations are inconsistent but one does tend to find European Communities' material together and in fairly likely places. For 1976 onwards, because there was retrospective conversion from February 1977, the entries are less easy to find. I know that HMSO used to be heavily criticised for a low standard of cataloguing product. I have heard it described as 'execrable'. This is of course unfair because it was never intended to be library cataloguing and, I suppose that having adopted *AACR* HMSO might reasonably have expected to silence criticism. But, at least in so far as European Communities' publications are concerned I cannot agree that the changes are an improvement. I am not happy with the decisions made in the selection of intellectual authority headings. Some of the headings chosen are very obscure indeed; and this is made worse by the use of, say, the French form of the heading for documents in French. There are some rather arcane cross references and little in the way of supporting index entries. Moreover, it seems odd to me to put a monthly periodical under the name of the Directorate (not *even* Directorate-General) but to enter documents in a series under the series heading. On the whole I believe that the construction of the entries hinders rather than assists the retrieval of documents. I think that the whole enterprise is bedevilled by the attempts to adhere firmly to the concept of the main entry heading without adequate back-up from added entries. Plainly it was a very good idea to apply rigorous rules to the construction of the entries but I think that the let down is the choice of dud headings. It would be worth losing a bit of internal consistency to have very general headings back.

In all fairness to HMSO they usually provide the most rapid bibliographic data even if it is only within strict limits. I use to find the *Weekly list of government publications from Her Majesty's Stationery Office: a selection of interest to local authorities* a particularly helpful current source but I notice that I have not received one since 18 May 1979 and I presume that its fate is linked with the difficulties over the publication of the *Daily list*. I found the *Weekly list* much easier to scan than the *Daily list*.

The most obvious retrospective source for priced publications of all kinds in the United Kingdom is the *British National Bibliography*. I have to report that I got only indifferent results when I ran a search on UKCMARC, which is the United Kingdom data base 1973 to date. There seem to be rather a lot of headings in use and I suspect that it would be extremely difficult to retrieve all European Communities' publications for certain dates for example, even within the *BNB*'s parameters. On the other hand there are more access points for the user in the *BNB* than in the HMSO catalogues and even more in Blaise though I do not think that I can recommend on-line searching here for the retrieval of European Communities' references. There are a lot of documents in the system and one has the chance of picking up references to some of the material not handled by HMSO.

Publications of the European Communities is a monthly which also appears as the last section of the *Bulletin of the European Communities*. It claims that it includes 'both official and unofficial publications,' though I am not clear what they mean by this. It lists sales publications and some at least of the *gratis* publications though not necessarily all the material which emerges from the Information Offices of the Commission in various parts of the world. It does not seem to include much in the way of limited distribution documents. One of the big irritations that I find in using this list is the multilingual format. The entries cumulate into annual volumes which are rather more palatable because of the division into language sections with indexing. Inconsistencies certainly exist but the main problem is that one does not know what the coverage is supposed to be.

The annuals start in 1974. There was a multilingual *Catalogue of the publications of the European Community Institutions 1972-73*. This was produced in two versions of which only the second should be used. This has Edit2/1974 on the back cover. The first version has a sub-title, 'provisional edition for the internal use in the departments of the Commission of the European Communities'.

A *Catalogue des publications 1952-71*, Vol. 1, was issued in 1972. It was accompanied by a *List of the publications of the European Communities in English, supplement to the French edition of the 'catalogue of publications of the European Communities 1952-71.'* The first of these was in French only, and the latter listed only those documents which had been translated into English. There never was a volume 2 which would have been devoted to scientific publications of a highly technical nature.

It should be remembered that the *Catalogue des publications 1952-71* does not completely supersede the earlier sales catalogues which had been issued from time to time. Moreover, it is not particularly easy to use, but for the period covered, it is probably the best single source we have.

The scientific research programme of the European Communities is fairly esoteric but the literature is well served with *Euro abstracts*, which was known as *Euratom information* from 1963 to 1969. It will become available on line from ECHO⁵ in Luxembourg which is one of the Euronet DIANE hosts. ECHO will also provide other data bases on Community research projects.

Of the other main on-line services I have already mentioned Blaise which contains a considerable amount of European Communities' material. CEE, which is the case law of the Court of Justice of the European Communities, will be available on DIANE from CED in Rome. In 1980 EUROLEX which is owned by the European Law Centre will have put up a European legal data base which will initially include *Common Markets*

Law Reports in full text. Others will speak of the data bases not yet commercially available.

For limited distribution documents, the best single source is the *Documentation Bulletin* (formerly *Bulletin on Documentation*). This is really a current awareness service for the Commission, but obviously it has a very wide external readership as well. The Central Archives and Documentation Service, which like the Central Library is a part of DG IX, has produced some kind of a service from as far back as 1964 but there have been a lot of changes of format in the intervening years.⁴ Basically the objectives have been twofold. In the first place to provide a current awareness service from a wide variety of sources, but especially from periodicals, on all matters relating to the European Communities. Secondly, to produce bibliographies on particular topics of high interest to the Commission. As well as non-official sources, a great many European Communities' documents are listed which are not so easy to trace elsewhere. No serious student of the European Communities can afford to neglect the *Documentation Bulletin* both as a current and as a retrospective source.

The trouble with limited distribution documents is that they are not necessarily dedicated to the public. For example, if one looks at the *Working documents of the European Parliament* the papers seem to fall into three categories

- 1 Material distributed to European Documentation Centres and Depository Libraries.
- 2 Material distributed to Depository Libraries only
- 3 Material for which there is no external distribution.

In other cases it is less obvious if a decision has been made as to when or how a document will enter the public domain. COM documents are quite clearly institutional papers but they have such a common currency that they must be regarded as in the public domain when they are received by the Council of Ministers.

So far as COM documents themselves are concerned a valuable source in this country is *Trade and Industry* (or *British business*). As well as the weekly subject listing of recent legislation as published in the *Official Journal*, which is a useful current awareness service in itself, it lists.

'EEC documents . . . deposited in the House of Commons . . . Commission reference numbers, where appropriate, are given in parentheses. The documents are available for consultation at the European Communities Commission Information Office.'

The documents are listed according to the Council Secretariat number under the headings.

- Consultative documents
- EEC draft instruments
- Explanatory statements on draft instruments

It is a way of turning the Council Secretariat number which one might see referred to in *Hansard* back in to a COM number which is more meaningful so far as tracing a document is concerned.

This is fine for current searches, a rather more serious problem is how to trace COM documents retrospectively. Of the possibilities available I find *Europe today* published by the European Parliament most helpful. There are many irritations to be

faced in attempting to trace European Community publications whether by subject or in order to verify a citation. It may be that we expect too much since many of the documents which present the most difficulty are not conventionally published works at all but it is also clear that this is an area in which much useful work remains to be done.

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Gaps and inadequacies in the bibliographic control of the publications of the European Communities

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MY FIRST REACTION on receiving the invitation to give this paper was that half an hour would be long enough only to sketch in barest outline the most serious gaps and inadequacies in the bibliographical control of Community publications. My second and more considered reaction was the *rigor mortis* would have certainly set in long before the completion of a systematic, title by title description of the bibliographical deficiencies of numerous catalogues and indexes produced by HMSO, commercial publishers and the European Communities themselves. Consequently, I have decided to take a rather broad view of the problems of bibliographical control and particularly, to try to relate these problems to the publishing policy and practice of the European Communities, so far as that may be discerned. I have also decided to restrict my comments to Community publications alone.

In common with other intergovernmental organizations (IGOs) the European Communities sustain a vigorous publications programme. Publications are issued for consumption by the common man and the specialist, the casual reader and the committed researcher. They explain the nature and the aims of the organization, they describe the work of the main institutions and report on the implementation of policy, they disseminate the results of the immense amount of expert and often highly specialized investigatory work done by or on behalf of the institutions of the European Communities.

However, if publications are to be an effective channel of communication between the European Communities and the outside world then there must be adequate means for bringing their existence to the attention of potential customers and consumers. This is particularly crucial in the case of an organization such as the European Communities in view of the nature of its publishing operations. Along with those of other IGOs, Community publications may be considered to be non-conventional in the sense that they are not issued through normal commercial channels. They are not published primarily with a view to sales revenue, they do not benefit from the hard-sell marketing tactics employed by commercial publishers and are disadvantaged by a relative lack of publicity in national bibliographies, journals and trade literature. The clear danger is that without an adequate means for bringing them to the attention of their intended audience publications will receive only a fraction of their potential use simply because their existence is not common knowledge.

If Community publications are to avoid this fate then there must be a regular, comprehensive and current source of information on recent publications and a definitive consolidated catalogue of those publications issued over a given period of time. Without an adequate means for publicising recent publications it is all too easy for new books to slip by unnoticed; without a permanent record of what the Communities have published over a period of time it is all too difficult for known items to be traced and their bibliographical details verified. In order to test the adequacy of existing provision I would now like to look more closely at the nature of the arrangements made for the bibliographical control of a number of defined categories of material.

Sales publications

These are publications designed for external consumption and made available for sale by the Office for Official Publications of the European Communities, an inter-institutional service set up in 1969 to print and sell publications from the Council, the Commission, the European Parliament, the Court of Justice and the Economic and Social Committee. They may be reports and studies prepared in conjunction with the pursuit of Community goals, statistical and other serial publications, conference proceedings and so on. The majority of sales publications come from the Commission of the European Communities. More precisely, they result from the deliberations of the Consultative Committee on Publications (CCP), established by the Commission in 1973 to bring a degree of coordination and control to its external publishing programme. Composed of senior officials from various Directorates-General and other services the CCP may be said to have a threefold function. Firstly, it is responsible for the quality control of sales publications issued in the name of the Commission. Each of the principal publishing services within the Commission, namely, DG X (Information), DG XIII (Scientific and Technical Information), the Statistical Office and DG IX (Personnel and Administration), acting on behalf of all other Directorates-General, is required to submit an annual publishing programme for the Committee's approval and to subject each of its proposed publications to detailed Committee scrutiny. The CCP can make recommendations on such matters as intellectual content, the technical arrangement of material, methods of production and can even call for the withdrawal of unsuitable proposals. Secondly, the CCP is concerned to ensure that Commission publications achieve as wide a circulation as possible. Consequently, it deals with such matters as pricing policy, free distribution, publicity and the means of bibliographical control. Finally, the CCP has a pump-priming function in the sense that it is concerned to ensure that the wide range of Commission activities are adequately represented in its publications programme.

The bibliographical control of sales publications emanating from the CCP and other Community institutions is based on the consolidated *Catalogue des publications* 1952-1971, the monthly *Publications of the European Communities* issued since 1974 in the *Bulletin of the European Communities* and as a separate offprint and its annual cumulations. Above all else these are sales catalogues, the overwhelming majority of their entries relate to sales publications and they are designed in such a way as to provide all the information necessary for sales to be effected.

The desire to attract wide circulation for Community publications is usually sufficient motivation to ensure that sales publications appear in the monthly publications list. However, the lack of an index to its contents and its mixed language format make it an extremely tedious and frustrating tool to use and one from which it is impossible to obtain rapid retrieval of information. The benefits of a single language arrangement and an alphabetical title index in the annual catalogue are largely offset by its tardy appearance, the latest volume being for 1976, although I believe 1977 to be with the printers.

The Office for Official Publications has recognized these deficiencies and hopes to introduce an automated cataloguing system before the end of 1980. The intention is to publish a new style monthly catalogue arranged according to a subject classification with a cumulative title and series index. Unfortunately, in my view, current plans are for the continuation of the irritating custom of listing serial titles without reference to the specific parts that have appeared in the period under review and, more regrettably, for the continuation of the mixed language format, although I understand that at least the monthly indexes will be in separate language sections. It is also envisaged that the annual catalogue will follow a scheme of presentation suitable for each national market. As far as the United Kingdom is concerned, the catalogue will list all publications issued in the English language and will include other language editions only when they are not otherwise available in English. In view of the fact that this project is being undertaken in association with the same commercial firm as introduced automated processes to HMSO catalogues I can only hope that the resultant benefits become evident more quickly than has been the case with HMSO services.

Although the deficiencies in arrangement make it difficult to retrieve information concerning sales publications they are at least reasonably well represented in the catalogues produced by the European Communities. However, there are other categories of material which are dimly if at all perceived by existing means of bibliographical control and it is to these that I would now like to turn.

Commercial publications

One group of sales publications which emanate from the Commission and which are not at all represented in the monthly and annual catalogues are the sales items whose publication is contracted out to commercial publishers by Directorate-General XIII (Scientific and Technical Information). An important responsibility of DG XIII is to disseminate the research results of scientific and technical work done by and for the Commission and to act as an author service for scientific publications derived from the work of other DGs in such fields as the environment, industrial affairs, health and safety, energy and agriculture. The majority of such items are printed and sold by the Office for Official Publications in the form of highly specialized EUR reports and listed not only in the monthly list of publications but also in DG XIII's own excellent publication *Euro abstracts*.

However, it is DG XIII's belief that commercial publishers, with their expertise, knowledge of the market, extensive contacts and sales outlets, can often achieve a better dissemination of important research results than the Communities themselves.

Consequently, DG XIII places its best quality material in the hands of commercial publishers. The majority are scientific but since DG XIII has been given responsibility for handling all Commission relations with external publishers this need not always be the case. Although the total number of titles placed with external publishers represents a small percentage of the total—this year about 45 titles out of more than 250—this represents about 50 per cent of the total number of pages published by DG XIII. As the cream of DG XIII output these publications are likely to be of high quality and in some demand. Although it would appear that they are to be listed in *Euro abstracts* in future they do not appear in the monthly and annual catalogues and therefore remain extremely fugitive publications. Whilst I can understand the Office for Official Publications' reluctance to publicise the wares of its competitors, to include a section for 'items commissioned but not published by the European Communities' would be in the general Community interest since it would undoubtedly assist the wider dissemination of Community-based research.

Free publications

A principal objective of the publishing programme is to reach as wide an audience as possible with information on the activities and achievements of the organization. Sales revenue is of secondary importance, as witnessed by the fact that the Communities give away more publications than they sell and by the still modest list prices attached to their publications. This low profit motive is further illustrated by the wide range of free publications issued by the institutions of the European Communities in an effort to inform and to explain, to kindle and sustain public interest in the work of the organization. Aimed primarily at the non-specialist the majority of these publications, though by no means all, emanate from the Directorate-General for Information (DG X) and from its national offices in Member States and elsewhere and as such may be considered to constitute an integral part of the information policy pursued by the European Communities.

They may be printed by the Office for Official Publications but are not stocked by the Office since that organization is a sales office and all free distribution is undertaken by the originating institution. Neither would it appear that they are systematically entered in the monthly list of publications. Free serial titles designed to keep interested readers well informed about institutional activities, such as *Euroforum* and *European Community* are well represented. However, it would appear that the decentralized nature of free publishing within the Communities causes rather patchy coverage of one-off publications in the monthly and annual catalogues. Free publications are not always ephemeral or insubstantial. Without their consistent representation in the monthly and annual catalogues many will achieve only limited circulation and much of their value will be dissipated.

Limited distribution material

Items which receive limited distribution are primarily compiled for the use of Community institutions and departments, national administrations and other limited audiences. They are not necessarily restricted in terms of confidentiality but neither

are they placed on sale, given positive publicity or printed in substantial numbers. Those which emanate from the Commission by-pass the CCP since they are not publications as such, nor are they printed by the Office for Official Publications. They are available, if at all, only from the issuing authority. In my experience, most frequent demand for this type of material in academic libraries has centred around the reports of groups of independent experts invited by the Commission to look at a particular matter of concern. Some such reports later achieve full publication, usually in the *Studies* series, but other notable reports such as the *Optica* reports of 1975 and 1976 remain unpublished. A handful of limited distribution items creep into the monthly and annual catalogues and into the *Documentation bulletin* but not on a consistent basis. The majority remain in that no-man's land between full publication and total restriction and are practically impossible to trace.

Documents

If publications are instruments for making Community activities better known to the outside world documents are generally concerned with the internal life of the organization. They form the usual mode of communication between officials, departments and institutions and between the Communities and national governments. Although the majority of such documents are addressed and restricted to specific internal audiences a limited number of classes of document are publicly available from the Commission and the European Parliament. Unlike *European Parliament working documents* which are available on subscription from HMSO, public documents from the Commission, the COM documents we heard about this morning, are not placed on sale. They are publicly available in the sense that they are available for consultation in the London Office of the Commission, in European Documentation Centres and in Depository Libraries. They are also available on a one-off basis direct from Brussels.

Despite their essentially internal nature such documents can often be an invaluable source of information for external users. For the businessman and industrialist, for instance, Commission proposals for legislation often provide an early indication of official thinking and intentions on a particular issue. For the academic researcher collections of documents offer a unique insight into the workings of the organization and a detailed record of the development of policy. However, as working tools designed to meet the needs of the parent organization they display a number of prominent characteristics which can impede external access to their information content. They are produced in a physical format designed to satisfy the immediate needs of the organization but which pose libraries significant problems, the sheer quantity of documents is intimidating and can be a severe deterrent to effective use and the fact that they are often written by specialists for specialists can also obstruct access to their intellectual content.

Above all they suffer from levels of bibliographical control that make it difficult for secondary users to exploit this rich reservoir of primary data. The only published source of information on Community documents is the *Documentation bulletin* produced by the Central Archives and Documentation Service (SCAD). Despite the value of this publication, particularly its cumulative supplements, its lack of an index severely restricts its usefulness as a retrieval tool. In recognition of the need to manage

its documentation more effectively the Commission has introduced computer-based information retrieval systems, administered by a special central unit within DG IX (Personnel and Administration) called CIRCE (European Communities Information and Documentary Research Centre) It seems to me that the only way external users are likely to see significant improvements in the bibliographical control of Communities documentation is for them to derive some benefits from these presently internal information retrieval systems.

Community legislation

Finally, I would like to say a few words about the bibliographical control of Community legislation since it is the power to make law which can directly override and supersede existing national legislation that makes the European Communities a unique intergovernmental organization. To the extent that all legislative acts are published in the *Official Journal of the European Communities* Community law may be said to be readily available. However, it does not follow that by the same token Community law is easily accessible. Those of you who have had even a passing acquaintance with that unique and formidable publication will know that much remains to be done to improve the ease with which information may be extracted from its numerous pages. The inadequacies of the index to the *Official Journal* are too well-known to merit further comment; suffice it to say that most of them derive from the fact that it is an index compiled by Community officials with the needs of other Community officials and the initiated in mind. The people who use the *Official Journal* in our libraries would not necessarily expect to find references to legislation on fisheries policy under AGRICULTURE or to measures to combat poverty under SOCIAL POLICY, they would not necessarily be familiar with such Community jargon as INTERNAL MARKET, APPROXIMATION OF LEGISLATION and ENLARGEMENT, nor would they be likely to find the many references to specific topics buried under such general and unhelpful headings as INSTITUTIONS OF THE EUROPEAN COMMUNITIES and LAWS AND PROCEDURES. Clearly, there is an urgent need for an index that will allow direct access by specific subject. Until such time as it appears those unfamiliar with the structure and policies of the European Communities will experience frustration in their use of the *Official Journal* and increasingly will have recourse to non-official services for assistance.

Such is the nature of Community legislative procedures that there are considerable gaps as well as deficiencies in the bibliographical control of Community law. There is no provision, for instance, for distinguishing between those acts still in force and those that have been superseded or whose authority has lapsed. If a piece of legislation has been partially amended or superseded by subsequent legislative acts existing indexes provide no linking mechanism to allow easy identification of all relevant texts. The Special Edition of the *Official Journal*, for instance, contains only historical texts of legislation as originally enacted. It neither provides references to subsequent amending acts nor includes the adaptations of many acts which were agreed during the enlargement negotiations. Equally, in all but those few cases where the Communities have put together a compendium of major legislative texts on a particular subject it is all too difficult to find out precisely the current state of legislation on a particular topic.

Clearly, there are problems involved here that would be considerably alleviated by the consolidation of Community law and the publication of a 'statutes revised' edition of Community legislation, giving the text of each act in its latest amended form. In the meantime, what is required is a subject index to legislation currently in force. And this, pleasingly, is what I understand we are about to get. In early 1980 the Office for Official Publications is to publish a subject index to all binding Community instruments in force on 31 March 1979. The intention is for this publication to be kept up-to-date on an annual basis. Properly prepared and regularly published this bibliographical tool should prove to be an invaluable aid to the effective exploitation of Community legislation.

Conclusion

It would seem to me that the uneven level of bibliographical control exerted by the European Communities over their publications and documents is a reflection of the rather fragmented nature of their publishing activities. In a situation in which there is no single source of Community publications and documentation, where institutions and their departments have wide discretion over publishing and printing activities, then the means of bibliographical control will also be dispersed, variable in quality and partial in their coverage. We can, I think, expect improvements in the production and arrangement of specific titles. However, the publication of a single, authoritative source of bibliographical information will have to await, in my view, greater centralization of Community publishing activities. In the meantime, rather than look to source of publication for the means of bibliographical control perhaps we should look instead to some central collecting agency for bibliographical information.

The Central Library of the Commission receives Community publications and public documents and has recently introduced automated cataloguing processes which allow the production of regular accessions bulletins. I just wonder whether a regularly produced list of Community publications and documents received in the Central Library would not be of significant assistance to libraries and other external users of Community documentation.

Some recent developments in documentation at the European Commission

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CIRCE¹

IN 1977 THE European Commission created a new division (IX/D/10) within the Directorate-General for Personnel and Administration. Christened CIRCE this unit was charged with developing and integrating the Commission's automated files known as CELEX and ECDOC (now ECO1). At the moment of writing these files have not yet come together onto the same computer nor can one be sure that they will ultimately do so. This is no impediment however to their being used meanwhile by Commission officials.

The system is operated by a network of Information Officers, one per Directorate-General or equivalent service, whose function it is to process documents generated within the particular sector and to answer enquiries from officials working there. A central team coordinates input. Although in principle each Information Officer has access via terminals to the whole of the data base, the more confidential items are protected through the use of a secrecy code.

The CIRCE files may be divided into two main categories, viz. (1) internal documentation (ECO1, formerly ECDOC), and (2) documentation of Community Law (CELEX)

(1) *Internal Documentation (ECO1)*

The documentary field covered is as follows:

- (1) Commission meeting papers,
- (2) Commission decisions taken by written procedure;
- (3) Documents sent to Council;
- (4) Record of Council decisions,
- (5) Summary records of Council and COREPER meetings;
- (6) Commission minutes;
- (7) Commissioned 'studies',
- (8) Questions (with answers to them) by members of the European Parliament

Quite clearly there is a strong confidential element in these files. That is why the public cannot have access to them via Euronet. Even so it is possible that libraries may eventually procure selective printouts on demand depending on how confidential or not the material is considered to be. Indeed there is already a product of this kind, a *List of pending legislation*, distributed twice yearly as a SEC document to Centres for European Documentation. Anyone wishing to see this facility extended is asked to communicate a profile of needs to the CIRCE management via one of the Commission offices in Britain.

(2) *Documentation of European Law (CELEX)*

Launched in 1971 by the Legal Service, CELEX aims to embrace the primary and derived law of the European Communities as contained in the

- (1) Treaties establishing the Communities;
- (2) Secondary or derived legislation,
- (3) Legislation relating to the Communities' external relations;
- (4) Complementary legislation (e.g. decisions of member state representatives meeting in the Council;
- (5) Preparatory work and parliamentary proceedings which form part of the legislative process (e.g. Commission proposals, opinions of the European Parliament and of the Economic and Social Committee),
- (6) Judgments of the Court of Justice;
- (7) Parliamentary questions with answers.

Unlike ECO1 the CELEX files have a definite public dimension and will therefore be entered into Euronet. It is true that they are still incomplete for the earlier period of Community law. However the aim is to clear away this backlog in three years. Any further input beyond then will consist entirely of new documents and updated old ones. In the meantime all efforts are being concentrated on feeding the system with complete texts of official instruments in the six Community languages.

In one important respect CELEX has already proved its maturity and practical worth. From it at the present moment is being constructed a monumental *Repertory of Community law* which will be published early in 1980, with a second edition to follow later in the year. It will contain, (1) agreements between the Communities and other states, (2) binding Community law, (3) complementary law, (4) derived law as published in part L of the *Official Journal*, and (5) acts published in part C of the same. There will be indexes by key-word and document number.

Other data-processing activities at the Commission

The Commission's latest annual report² on this theme describes a wide and growing variety of services which may be grouped under three headings, (1) management and financial applications, (2) statistics, and (3) documentation management. Some of the more recent applications that have been made are systems for textile monitoring and processing of GATT data. There are also numerous projects within the financial and

budgetary fields, and plans too for automating the *Documentation Bulletin* of the Central Archive and Documentation Service (SCAD) Also worth noting are.

- (1) CRONOS, a statistical data-base intended for public use through Euronet issuing as by-products a number of important publications including a new bulletin on agricultural prices and indices;
- (2) EURODICAUTOM,³ a multilingual terminology data-bank used by the Commission's translators.

An important recent Commission document⁴ expounds a strategy aimed at removing the present huge American dominance over the European telematic market. The measures proposed are

- (a) a social policy to prepare the climate for innovation;
- (b) a homogeneous European public market for telematic equipment and services;
- (c) a European information industry,
- (d) industrial and user collaboration,
- (e) satellite communication,
- (f) new technologies, e.g. Euronet and a network of new telematic services linking Community institutions with the member governments.

This is of course an exceedingly ambitious programme which would require an intense and single-minded effort from Community countries. Fortunately the first most important brick in the edifice has already been laid in the shape of Euronet.⁵ Starting from there the Commission proposes to

- draw up a list of data-bases relating to general and sectoral policies worthy of being added to the Euronet-Diane system;
- study the technical problems associated with the above;
- identify gaps in coverage;
- study possible solutions to multilingual problems;
- examine how to create a wider market (e.g. in N. America) for the Euronet-Diane services.
- look at the information needs of countries associated with the Community.

Official publications⁶

It is not hard to imagine some of the problems associated with publishing in six languages. The task clearly requires a considerable effort of planning and coordination at many levels. Indeed the operation is so complicated that one is entitled to wonder how it proceeds at all. This point should be borne in mind by anyone tempted to bemoan the admittedly imperfect results achieved by the Communities.

The Community institutions have their individual publishing policies. However the printing and sales operations for them all are largely concentrated in the Commission's Publications Office in Luxembourg. This Office is subject to an inter-institutional Management Committee and, for the Commission, to a Consultative Publications Committee which meets monthly. The latter committee is made up of representatives from departments affected, including the initiators or producers of texts (e.g. DG's



II, V, X, XIII, Statistical Office, Secretariat General), the processing service (Publications Office), the committee's secretariat (DG IX), and other advice-giving services such as DG XIX and the Commission Library. This mix works harmoniously.

The Publications Committee has a great deal to keep it busy. One of its chief preoccupations is first to scrutinize each Autumn the lists of titles proposed for publication the following year and then at monthly intervals thereafter any suggested modifications or additions. The Committee also uses its influence to stimulate the production of new titles by indicating gaps in coverage of particular areas. It tries as well to cultivate among the services a self-critical view of their publications by means of 'reading committees'.

This is not the place to examine the range of publications brought out by the Communities since that task has been well enough done in two recent books.^{7,8} There is a point however that deserves special mention and it is DG XIII's⁹ deliberate policy of allocating specialized scientific manuscripts to private publishers instead of to the Commission's own Publications Office. This line of action has been taken on the grounds that since private publishers know their own markets best they can be expected to serve the interests of the Communities by ensuring the widest and most effective dissemination for this specialized type of publication. It should be noted that these titles are left out of the official sales catalogue; on the other hand they do figure in *Eurabstracts* alongside the Communities' official publications on science and technology.

The Publications Committee's most recent initiative has been to launch a new series of publications entitled *European Perspectives*. This will contain from six to eight volumes a year, each about 100 pages long, ranging over the legal, social, economic and historical aspects of European integration. Its prime aim is to inform European citizens about matters of direct interest in straightforward language they can understand. It is also directed at the Commission's own services to help them focus more clearly upon their objectives.

Another present concern of the Committee is the network of European depository libraries and documentation centres. Hitherto these collections have been set up almost exclusively in colleges and universities out of a policy to encourage studies on European integration. The question now being asked is whether this academic criterion is the sole one that should be applied when determining the location of Centres. There is, after all, an increasing demand for Community information from business circles, industries, local authorities and the general public. Again, it seems legitimate to expect the libraries of European Documentation Centres to be properly administered and exploited by *trained* librarians and for their contents to be made freely available to the public instead of, as is sometimes the case, to a purely specialized clientele. With these points in mind the Committee has recently begun to review the situation with the help of other interested parties such as the Secretariat General and DG's X and XII.

On the subject of indexes and catalogues there is no hiding the dissatisfaction of librarians with the present state of things. Indeed it is public knowledge that the Library Association has invited the Commission to share in a Working Party to examine ways of bringing about improvements. This is a promising initiative. Nevertheless it ought to be said here and now, in all fairness, that the Commission is perfectly aware of the problem and is taking steps to remedy it within the limits

of its resources (the eternal constriction). Librarians will be glad to hear that starting with the April issue the sales catalogue (printed on yellow pages in the *Bulletin*) will be totally remodelled as a result of automation. Furthermore it is planned to issue a single computer produced index to the *Bulletin* and *General Report*. In addition the addressing and distribution processes are to be automated.

Library

In just over 20 years the Commission Library has built up a fine collection on European integration. At its core lies a near complete set of Community publications together with some (though by no means all) working documents put out by the different services. The collection is strongly multilingual, that alone gives it a special identity, and it has the added advantage of containing a fair proportion of publications and documents from other intergovernmental bodies. Not surprisingly readers are attracted to it from universities and institutes quite apart from the Commission's own services. This dual function will undoubtedly intensify with the passage of time.

It would be unrealistic to expect the Library to satisfy all the detailed information needs of Commission officials. The field is too wide and deep. For this reason each Directorate-General or equivalent service maintains its own specialized documentation centre. The fact that these centres all order their stock through the Library and have it processed there makes it possible to pursue a rational overall acquisitions policy within the framework of a single budget. This is both economical and practical. The Library also cultivates close relations with other related services such as 'Documentation' (IX/D/1) and CIRCE (IX/D/10), and with the libraries of sister Community institutions such as the Council and the European Parliament. There are links too with the European University Institute in Florence.

Occupying this central position and conscious of its potential as a disseminator of information on Community affairs the Library has recently automated its cataloguing procedures so as to permit the printing of lists in multiple forms. First results can be seen in the new-style monthly *List of acquisitions*. Very soon a cumulation will be made of exclusively Community publications for the years 1978 and 1979. That will be followed periodically by subject bibliographies.

The system used was designed primarily to afford flexibility. For instance it had to bend towards the bibliographical complexities present in Community publications (e.g. multilingual titles) whilst being able to generate a variety of catalogues suited to diverse needs. A batch system, it now contains about 9000 entries after a year's input.

It remains to be seen whether this useful and quickly growing data-base will be judged worthy of conversion to on-line, possibly within the framework of Euronet. For the moment all one can say is that a request to have this done has been submitted in the manner required. Meanwhile the problem has to be faced, as with all batch systems, of coping with ever more voluminous printed paper catalogues. To solve it the Library will soon begin producing COM-fiches which will be placed in cassettes for use on automatic microfiche readers.

Another radical change introduced by the Library was the abandonment of the UDC classification in favour of a thesaurus. This decision was not lightly reached since it involved breaking a 20-year tradition. Tradition or not there was clearly no

virtue in maintaining a system simply because it had always been there, especially not when that system was producing an increasingly unwieldy catalogue. So a new road was taken and old habits discarded.

For the following reasons the choice of a new indexing tool fell upon the OECD's *Macrothesaurus*¹⁰

- the OECD is a fellow intergovernmental organization;
- its interests overlap with those of the European Communities;
- its thesaurus is trilingual (English, French and Spanish),
- a revised version was being prepared at the critical moment,
- a modified version was in use at the ILO,¹¹ also an intergovernmental organization;
- the *Macrothesaurus* has a sensible structure in line with modern knowledge

Because the *Macrothesaurus* treats some subjects too generally it was decided to take a pragmatic approach and enlarge it with terms taken from a pre-existing index to the Library's subject catalogue. It was also necessary to add new groups for the European Communities (01 05/11) and to expand the section on Law and Politics (04). This exercise is now completed in its first stage. What remains to be done is the considerable task of building in relationships and after that the preparation of versions in English, German and Italian. Copies of the thesaurus in its provisional form will be made available later this year.

A final point worth noting is that the European Parliament is independently working on a revision of certain sections (notably 04) in the OECD *Macrothesaurus*. As and when parts are completed these are sent to the Commission Library for possible inclusion in its own enlarged version. In return the European Parliament Library has accepted to use the latter for indexing parliamentary questions. Valuable experience is thus being acquired in two places at once.

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Discussion

SESSION 1

ALAN CARTER (Steetley & Co., Worktop) asked what effect the directly elected European Parliament was having on the Scrutiny procedures. JOHN GUY (Foreign and Commonwealth Office) replied that the short answer was none, so far. However, these were still early days, and the relationship between the UK Government, the European Parliament and the UK Parliament including the Scrutiny Committees was not yet clear.

ALEX DICKSON (Ealing College of Higher Education) asked three questions:

(a) If the seven Committees of the House of Lords Scrutiny procedures corresponded to the seven departments of the EC Information Office. JOHN GUY doubted if there was any connection, and remarked that the seven House of Lords Committees were merely a convenient arrangement for splitting up the work.

(b) If the documents were to be included in the House Commons/Lords automated information retrieval systems ROHAN BOLTON (House of Commons Library) commented that the House of Commons Library maintained a strip index of EC legislation which was updated as it passed from proposal through discussion stage and on to final legislation. It was envisaged that the House of Commons Library would have a computerized retrieval system from next year and that EC material would be included in about three years time.

(c) If item and term entry would not be more useful than UDC for retrieval of information. JOHN CHILLAG (British Library Lending Division) suggested that it was up to the individual countries to use the system best suited to their particular needs. JOHN GUY followed by saying that in his experience, once the document number was known then the subject content was known. The enumeration was the key to the subject content, and enquirers could specify block numbers for subjects of particular interest.

JOHN JEFFRIES (University of Kent) commented that there appeared to have been a reorganization of Commission responsibilities with regard to European Documentation Centres (EDC's). He went on to ask if their transfer from DG X to DG XII would lead to any policy changes for EDC's in the future. EMMA HARTE (Commission Office, London) confirmed that EDC's were now the responsibility of DG XII. ERIC GASKELL (Commission Library, Brussels) reminded the audience that the Commission was to be restructured for 1981. It remained to be seen how this would affect the functions of DG's X and XII. For the moment DG XII is pursuing the same policies as DG X did before with regard to the European Documentation Centres.

MIKE HOPKINS (Loughborough University) asked if explanatory memoranda from Government Departments might be made available for public access. JOHN GUY replied that such memoranda were written by Government Departments and signed by Ministers for the Scrutiny Committees and Parliament as a whole. They were not generally available to the public. He felt sure, however, that if an interested party wished to see a particular memorandum he would be able to do so via an MP or a member of the Scrutiny Committee.

JUNE NEILSON (Queen Mary College, University of London) asked if the Commission Office in London was intending to continue the publication of the monthly periodical *European Community* in view of the discontinuation of *Community Report* by the Dublin

Office EMMA HARTE confirmed that at this stage, the London Office had no plans to discontinue the publication

ILSE STERNBERG (British Library Reference Division) asked if there was any substantial change in the final version of a COM document when it appeared in the *Official Journal* C series EMMA HARTE confirmed that the only difference was that the *Official Journal* did not contain the initial explanatory memorandum. Otherwise it was identical.

ANGELA SCOTT (McKenna & Co., London)

(a) Asked how one discovered the membership of the House of Lords/Commons Select Committees DAVID WATKINSON (Durham University) drew attention to the publications *House of Lords Weekly Information Bulletin* and *House of Commons Weekly Information Bulletin* both of which list the membership of the Committees and the Community documents received, quoting both Council and COM numbers

(b) commented that some of the press reporting of recently published documents was misleading, particularly with regard to the time-lag involved in proposed legislation and the delay in availability of draft documents in this country JOHN GUY remarked that good press reporting was dependent upon good contacts in Brussels. Many Commission documents did not lend themselves easily to reporting and the general public seemed not to be interested in the detail.

ERIC GASKELL asked if there were Scrutiny procedures in other member countries. JOHN GUY replied that the Danish Parliament delegated total power to a Scrutiny Committee which took evidence from Ministers prior to their appearance in Brussels. The Governments of other Member States send documents to their representative national Parliaments for examination, but no other country has adopted arrangements as comprehensive as those in Denmark and the United Kingdom.

ALAN CARTER asked if, therefore, the British Government felt bound by the Scrutiny process. JOHN GUY replied that Ministers took note of Scrutiny Committee advice, and of the views expressed in Parliamentary debates on Community documents, when negotiating in Brussels It would be unrealistic, however, to expect the United Kingdom viewpoint to prevail over those of the other Member States and the Community's Institutions. The arrangements for Parliamentary Scrutiny of EC business are therefore flexible enough to permit Ministers to compromise in Brussels, when necessary to protect UK interests Of course, Ministers stand firm, with Parliamentary backing, on important issues e.g. the fisheries problem

SESSION 2

ALEX DICKSON observed that the EC had carried out a good deal of useful work in compiling an automated translation system (SYSTRAN) which could be applied to the simultaneous translation of the *Official Journal* index into the six languages ERIC GASKELL commented upon the enormous problems of working in six languages, and was sceptical about the possibility of solving them by purely automatic methods. It was interesting to note that there had been a suggestion to reduce the number of official languages when the Communities absorb three more countries, though the proposal had been objected to by certain members of the European Parliament. JOHN JEFFRIES expressed the view that the *Official Journal* index was highly structured and that British librarians would like to see a change in the rules used for compiling the

subject headings. He continued with the observation that the John Rylands Library at Manchester University had shown that a KWIC index was perfectly feasible for Community documents. This method might successfully be applied to the *Official Journal* index. ERIC GASKELL suggested that criticisms of this nature should be very specific and detailed solutions should be transmitted to the appropriate authorities in Brussels and Luxembourg.

EDWIN FLEMING (Liverpool City Library) commented on gaps in bibliographical control. He expressed concern at rumours that HMSO were to discontinue the monthly publication *Secondary Legislation of the European Communities*, thus creating a further gap in the exploitation of legislation. ROBERT FELGATE (Department of Trade and Industry Library Services) confirmed this news saying that the Statutory Publications Office felt that in view of an improved English index to the *Official Journal* and listing of legislation in *Trade and Industry*, they need no longer produce the monthly publication beyond December 1979.

ALAN CARTER asked how one obtained free publications from DG X. EMMA HARTE confirmed that individuals might be placed on the mailing list direct from DG X.

MIKE HOPKINS drew the members attention to the recently formed Working Party on European Communities publications, set up by the Library Association and the European Communities. A working document highlighting problems (e.g. distribution of publications, indexing etc.) had been drawn up by the LA side of the Working Party and submitted to Brussels. No one present was able to say if any progress had been made.

JULIA TOLSON (Greater London Council Research Library) expressed concern at the frequent delay in receipt and non-availability of COM documents in this country, and asked if a policy decision had been taken to limit the distribution. CARLO PAU (Commission Office, London) replied that there had been a delay in the receipt of the Diplomatic Bag in this country, but he hoped that this problem had now been resolved. He commented that the text of COM documents was often published in the *Official Journal* within two or three days. ERIC GASKELL pointed out that not all COM documents appeared in the *Official Journal*, though the legislative ones certainly did. He agreed that there was inevitably a delay between the launching of a document and its publication in the *Official Journal*. In this respect the need was for librarians to receive COM documents with all possible speed. This point will be made known to the appropriate quarters. ALAN CARTER observed that facsimile transmission might help to overcome the problems of delay in receipt of a document. JOHN CHILLAG remarked, however, that this is not normally a convenient method of production because it is so slow and costly. It could, however, be used in specific, urgent cases. DAVID WATKINSON highlighted the problem of non-receipt of COM documents in this country by stating that the latest received by most EDC's was dated May 1979, received in July 1979.

SESSION 3

ILSE STERNBERG asked Mr Gaskell to define the difference between a European Documentation Centre and a Depository Library (DEP). In reply ERIC GASKELL said that in principle each country had one DEP (the National Library) with a complete

set of documents available to all. EDC's had been established in certain universities and colleges maintaining courses on European integration. There was also a small number of Mini-centres receiving a selection of Community publications. However, it had recently become clear that the demand for Community documentation extended far beyond the universities into industry, commerce and other fields. For this reason DG XII and DG X had circulated a questionnaire to EDC's the answers to which were currently being correlated.

ALEX DICKSON advocated an increase in the number of Mini-centres in, for example, selected Public Libraries. This prompted ERIC GASKELL to enquire if there was a general feeling that there should be a greater number of Centres receiving a more selective distribution of publications. JOHN JEFFRIES observed that it was important that designated EDC's should be assured of receiving all documents to which they were entitled and MIKE HOPKINS commented that it would be extremely difficult for the European Communities to be more selective in its distribution. ERIC GASKELL informed the seminar that SCAD (Central Archives and Documentation Service) was planning to automate its distribution procedures later in 1980.

CARLO PAU asked for an explanation of CIRCE. ERIC GASKELL replied that it consisted of (1) ECDOC (now ECO 1) which was internal and contained confidential material and (2) CELEX which was concerned with European law and already available via EURONET. By 1983 CELEX would be a complete data base retrospectively. The speaker went on to outline a proposal, that interested users of CIRCE should make known their requirements via the London Office of the Commission. Only by assessing requirements could the CIRCE management offer the best service. ERIC GASKELL further commented on a 6 monthly SEC document which had been distributed to some EDC's (*List of pending proposals at . . .*). If this is what librarians wanted they should inform CIRCE via the London Office. The SEC document could be added to the circulation list for all EDC's.

RASHID SIDDIQUI (Leicester University Library) asked if there was any possibility of making these data bases available via EURONET. ERIC GASKELL confirmed that only CELEX would be available—it had never been intended to add ECDOC.

ROHAN BOLTON asked if it would be possible to have the relevant COM number added to the preamble of adopted legislation in the *Official Journal*. ERIC GASKELL undertook to investigate the possibility of including this information.

EDWIN FLEMING commented

(a) On the apparent success of the KWOC indexing of American Government documents. He suggested that this method might be used as a solution to the problem of adequate indexing of Community documents. It would also result in greater speed in initial production.

(b) On the financial problems which Public Libraries in this country were currently experiencing. He observed that many Public Libraries (which do not freely receive European Community documents) might have no choice but to cut down on the purchase of primary European Community material. ERIC GASKELL understood the problems and said that any dissatisfaction should be made known to the London Office. JOHN CHILLAG reported on the success of the NTIS COM-fiche keyword index.

ERIC GASKELL asked if libraries would be interested in receiving microfiche copies of full text COM documents. JOHN CHILLAG argued that normally a printed document was available in advance of a fiche copy and there might, therefore, be no advantage in this

ROBERT FELGATE asked

- (a) Whether the Commission Library had access to the CRONOS data base of the European Communities Statistical Office. ERIC GASKELL replied negatively although he observed that the data base was intended to be made available through EURONET.
- (b) If there were any plans to put the Commission Library catalogue up online. ERIC GASKELL commented that the Library had proceeded cautiously, introducing first of all a batch system capable of producing a variety of catalogues. It remained to be seen whether demand from libraries outside Brussels justified converting the system to online. Even if this turned out to be the case there remained the problem, in times of austerity, of finding Computer Centre resources to do the conversion. In the meantime means were being examined of producing a COM-fiche catalogue

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by
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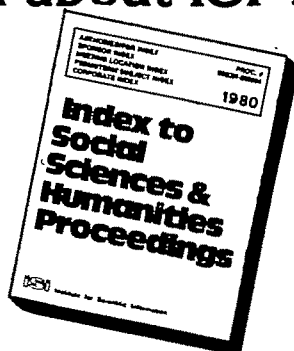
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Cuts and the special library

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1. Introduction

WHEN THE CONFERENCE ORGANIZER first approached me some months ago and persuaded me to deliver this paper, the title—initially 'Cuts *in* Special Libraries'—rapidly crystallised to 'Cuts *and* the Special Library'. This happened because I decided that I must cover the two aspects, namely public sector cuts which will impinge on special libraries and cuts in the provision of resources in the special library itself. I came to this conclusion since I see the two as interacting, as well as stemming from the same general economic climate in this Country, hence both aspects will affect most, if not all, of us who work in special libraries.

Incidentally, when I talk about special libraries I am using the term to cover the whole field of Aslib interest—special libraries and information bureaux. If at times I seem to be speaking from the point of view of the chemical industry library and information department in particular rather than of the special library in general, well I am, this is where my experience lies. However, I believe that what I perceive from this special position will nevertheless have a more general relevance.

Perhaps I might be allowed one more disclaimer before getting down to the subject. I feel it is not appropriate for me to comment here on the rights or wrongs of the basic Government philosophy which lies behind the public sector cuts. I will, however, have something to say about the way the cuts are applied and discuss the way—and to whom—we might respond concerning them and their effect.

2. Public sector cuts and consequences

John Donne wrote some 400 years ago that 'No man is an island entire of itself'.¹ This could be taken as the text for the first part of this paper since today no special library, however large or affluent, can be completely self-sufficient. All must rely, albeit in different ways and to different extents, on external services.

What sort of external services do I mean? It is not my intention, nor do I believe it would be your wish, that I catalogue all possible external services that a special library might use. Let me rather cite a few illustrative examples of external services we use.

1. British Library Lending Division
2. Her Majesty's Stationery Office

- 3 The Government Statistical Service
 - 4 Companies House
 - 5 Local Public Library Reference Department
 - 6 Academic—Polytechnic or University—Libraries
- Let us consider each of these in turn

2.1 *British Library Lending Division (BLLD)*

We are all of course familiar with the excellent service from BLLD at Boston Spa. Any library in this country which claims to be cost effective in its book and periodical purchasing must make some use of BLLD for loans or photocopies of material that is not in the mainstream of its interest, that is, for which the potential usage does not justify purchase by the library. This is particularly valuable in the case of books or journals which need to be consulted on a once-off or very occasional basis, a situation which is tending to increase in frequency with the growth in on-line searching. It must, therefore, be a matter of considerable concern that the cut of £5m in expenditure on the Arts has resulted in a cut in British Library estimates for the current year. No doubt expenditure for the next few years will also be severely curbed.

It is not certain whether, and if so to what extent, a proportion of these cuts will fall on BLLD. Clearly any curtailment of the service from Boston Spa will force the special libraries to increase their own spending or deny themselves the information they require. Taking the UK library network as a whole, this would represent a significant lowering of cost effectiveness which would be a retrograde step, particularly since BLLD was originally established largely to meet the needs of industry.

2.2 *Her Majesty's Stationery Office (HMSO)*

The Stationery Office is the source of much material which is vital to special libraries and the organisations they serve, e.g. the text of Acts of Parliament, Statutory Instruments, Guidance Notes relating to health and safety. As I am sure you will all know, HMSO has been under severe criticism of late, on account of the great difficulty many customers have experienced in obtaining essential publications from them, and it would be a cause for grave concern if cuts in Government expenditure were to make this situation worse.

I am happy to be able to say that this is one service that looks as though it will not suffer as a result of the cuts. Even better, I understand that the problems that have given so much cause for complaint are likely to be resolved within the next year or two with the implementation of a new computerised system, while the recently announced transfer of the HMSO from vote-financing to commercial-style operation as a trading fund should insulate it from Government-imposed cuts. Incidentally, much of the expected improvement in HMSO service follows intervention by the Aslib-CBI Panel on Information for Industry.

2.3 *Government Statistical Service (GSS)*

Many of you will be aware that the Government Statistical Service collects and publishes much information which is of great value to the market research and planning functions in business and industry. Of particular value is the Business

Monitor series published by the Business Statistics Office (BSO) of the GSS, the BSO gathers from UK manufacturers data of their sales and publishes the results in a series of quarterly statistical tables

It has been announced that Government-imposed cuts will reduce the BSO staff by 3 per cent this year, and much more by April 1982. The Director of BSO has admitted in public² that such reductions cannot be implemented without reducing the quality and/or quantity of information produced by the BSO, and therefore that users, that is business and industry, will suffer to some extent. The Director of BSO made it clear last November² that where the interests of Government and other users of business statistics differed, they would give priority to the needs of Government. BSO's decision was to streamline by raising the threshold below which companies would not be surveyed. At present companies with less than 25 employees are not covered, this threshold will be raised to 50 or 100 employees.

It is an ill wind that blows nobody any good, and clearly this decision will be welcomed by those in the small firms who will be released from the chore of form-filling for these surveys. However, this change will have a variable, sometimes drastic, effect on the value of the Business Monitors. In some sectors of industry firms with fewer than 100 employees comprise such a high proportion of the total that the change could make the resultant statistics worthless, at least to the business and industrial areas.

TABLE 1 *Establishments with less than 100 employees*

		Percentage of total		
		Enterprises	Sales	Investment
271/3	Other General	87	19	11
273	Toilet Preparations	81	12	20
274	Paint	85	17	17
275	Soap & Detergents	88	19	13
278	Fertilisers	87	15	4
279/1	Polishes	89	29	22
279/2	Adhesives	86	31	18
279/5	Inks	75	22	23
<i>(Source 1976 Census)</i>				

As Table 1 shows, in 1976 there were eight out of a total of 17 sectors of the chemical industry where establishments with less than 100 employees accounted for 15 per cent or more of the sales by and/or the investment in that sector. Limiting the survey to companies with more than 100 employees would exclude 75-90 per cent of all the companies in these sectors, accounting for up to 31 per cent of all sales. I understand that the CBI is very concerned at the implications for industry of the planned changes and is making representations to GSS with the aim of obtaining at least some moderation of the changes.

2.4 *Companies House*

Another Government service for which potentially very damaging cuts have been proposed is Companies House. Again there is a prospect of lightening the load on small businesses by reducing substantially the amount of information firms will have to file at Companies House. The proposals would comprise

- Abolishing the Registry of Business Names
- Surrendering the power of the Registrar of Companies to veto misleading names
- Waiving the requirement for the names of directors of limited companies to be shown on business letterheads
- Closure of the 'immediate' search facility, replacing it with a 'next day' response

However, information of this kind is a vital part of industry's ability to survive and prosper, and the proposed cuts would bring a serious element of doubt into business dealings which might restrict trade—exactly the opposite of the results desired.¹

The Aslib-CBI Panel is, I understand, taking action on this matter

2.5 *Local public library reference departments*

The importance to an organisation of the reference service of the local public library must vary widely, and will depend on the location of the organisation, and also to some extent on its business and the resources it allocates internally to library and information work. Thus those fortunate enough to work within easy reach of e.g. the City Business Library in London, or the Manchester Business Library, are liable to make much greater use of such facilities than those of us who would have to travel a great distance to find them. Also, small businesses might rely wholly or largely on the local reference department for facilities one expects to find in the library of a large firm, although there is far from universal awareness of the potential value of the service, and there is much room for improvement in overall effectiveness, given greater awareness. Nevertheless the local reference library is a valuable complement to the stock in the special library of even the largest company and I would be very surprised if any of you claimed that you *never* used it.

Not unexpectedly, Local Authorities are reacting in very different ways to the Government's demands for spending cuts. Reports vary from swingeing cuts in library budgets to, in one case at least, a 22 per cent increase. Table 2 shows a sample of the public library cuts for the current financial year.¹ Overall, despite the increase at Tower Hamlets, the picture is of significant cuts in the 1979-81 period following several years of reductions in public library spending.⁵

TABLE 2 *Public libraries Budget cuts*

	Total budget	Book fund
Humberside	1.8%	14.3%
Cheshire	3.4%	19%
Dorset	2.2%	'
Shropshire	'	20%
Tower Hamlets	Increased by 22%	

It can be no easy task for the senior librarians to determine how to apportion the cuts, e.g. between the book fund and other costs, and, within the book fund, between fiction, journals, reference works, trade directories, etc. How do you judge the relative values to society of a thriller, a love story or a trade directory? In the present economic climate, should you provide books of fiction or publications covering DIY and leisure activities to meet the needs of those, like early retirees, with greater leisure, or do you provide educational material to help retraining of the redundant, or trade directories etc to contribute to the stimulation of business and industry?

To the extent that UK industry is less well informed than its overseas competitors, it will be less competitive and the country's economic problems will be increased. The Public Library service has fulfilled, and I am convinced must continue to fulfil, a vital role in providing information to the industrial and business community. Hence it can be argued that resources allocated to that part of the library service which will help industry and business will, at least indirectly, contribute to the improvement of the country's economy and consequently to the releasing of more resources for the Public Library service.

2.6 Academic libraries

As with the public library reference departments, the value of academic, i.e. polytechnic or university, libraries to other special libraries will vary enormously, but again, I would be very surprised if any of you have never had occasion to seek help from an academic library. Their value can vary from the occasional back-up for literature relating to fringe interests, to continuing and high value in the case of a unique and specialised collection held by an academic library, that happens to cover a field of real significance to an industrial company.

Academic libraries are certainly not immune from the current wave of cuts, and however and to what extent these are applied, it would be surprising if the academic libraries did not show greater reluctance, perhaps to the extent of imposing specific constraints, to making services available to users outside the parent academic institution. The value of the occasional reference to academic libraries for fringe interest material must not be underrated. However it is in the case of the unique collections that the real problem lies. If access to these by industry were denied or severely constrained, industry must suffer a serious and irreplaceable loss of information, because of the nature of such collections it is inconceivable that industry could provide them, even partially, for itself.

Arguments used for help to the industrial and business community from the public library service apply equally in the case of academic libraries. It is therefore to be hoped that the impact of cuts on academic libraries will not affect too significantly their ability to help industry.

There is also possibility of a secondary effect. Cuts in academic library budgets might result in drastic curtailment of on-line facilities, and hence in the extent to which the next generation of graduates enter industry and business able to do their own on-line searching. This could have a serious impact on the way in which the roles develop of, on the one hand information staff in special libraries, and on the other, their clients.

3. How should we respond?

As I said earlier, that was intentionally only a partial catalogue of external services, and I am sure an incomplete description of the cuts to which they will be subjected. But I hope that it will serve to illustrate my point.

Let me return to John Donne and quote him further.¹

'No man is an island, entire of itself,
—, any man's death diminishes me,
because I am involved in mankind, and
therefore never send to know for whom the
bell tolls, it tolls for thee'

I put it to you that John Donne's words apply to the library network. We are all involved in the totality of the UK (or even world) library network and if the bell tolls for any part of that network, there is a sense in which it tolls for all, that is for each of us.

But what should, or can, we do about it? I mean, about the tolling for us of the bell on Government cuts?

The declared intention of the Government's decision to reduce public expenditure is to release resources for investment in commerce and industry. Very laudable, but if those resources are to be invested to the best advantage, it is essential that the decision on where and how to invest are grounded on a firm foundation of up to date, relevant, information. Who in this audience would dispute that, since to provide that information is our job?

However, many of our legislators, at both national and local government level, are unaware or grossly misinformed of the true role that public sector services should and do play in ensuring that UK business and industry have access to the information they need. Therefore *we* have a part to play in order that *they* may, hopefully, take the right decisions. Let me stress the point. *We* have this job to do, we cannot leave it to the other fellow.

How do we do this? I suggest

- (a) Establish the facts concerning the public sector services that you and your organisation need and use
 - what are they?
 - what cuts are proposed?
 - what are the implications of these cuts? i.e. additional costs for alternative sources of the information, or consequential loss resulting from information starvation
- (b) Find out whether Aslib, LA, Aslib/CBI Panel, etc are taking action concerning these cuts
 - if so, tell them about your problem. Additional factual information is very likely to strengthen their case
 - if not, encourage them to. I believe they are concerned and ready to take up any genuine case.
- (c) Keep your higher management informed. They may be able to exert pressure via a different route, e.g. CIA, CBI, Institute of Directors

I would like to make two final points relating to special libraries' use of the public sector. Firstly, it is easy to note, and take action concerning, sudden relatively large and well publicised cuts, what is more difficult to identify and probably in the long term more damaging is the effect of the insidious erosion of services resulting from budgeting constraints imposed over a number of years.

Secondly I believe industry should be, and is, ready to pay its way for services used, it is not looking for a cheap Government subsidy but for cost effectiveness on an overall national basis. If this means paying, or paying more, for the services it *needs* then industry will pay.

4. Cuts in special library resources

So much for other people's cuts and their possible effect on us. What about ourselves? As I said earlier, I am sure that all special libraries, even those at present not subjected to cuts or constraints, will be severely affected during the next few years. That is one of the economic facts of life for the UK in the 1980's.

How should we respond to this situation? I take as my text

'He who makes chaff of himself
the cows will eat'^b

I hope that the relevance of this quotation will become clear as I develop my argument.

The factors which lead to, or influence the extent of, cuts or budgeting constraints on special libraries are

- (a) The economic climate in the UK and indeed the whole of western society
- (b) The nature, and health, of the parent company or organisation
- (c) the location of the special library in the company or organisation, and coupled with this the attitude of higher management towards library and information services
- (d) The manager and staff of the library

It is fairly obvious that *our* influence and control increase from (a) to (d). Let us consider those factors in turn.

4.1 *Economic climate*

There seems little doubt that the future, at least for the next few years, offers little hope for a return of the UK economy to the boom conditions of the 1960's. For this reason, I believe we will all be faced with a period of greater or lesser constraint on resources. It is important, however, to recognise as I pointed out earlier, that the better UK business and industry is informed, the more competitive it will be and therefore while we cannot perhaps influence directly the overall economic climate of the western world, we can help to improve the relative position of our own organisation—and collectively therefore of the UK—within this overall climate. Since however this is very much a secondary effect I do not propose to dwell further upon it.

4.2 *Nature of the organisation*

The nature of an organisation—its objectives, its size, the range of products and technology for an industrial company, etc—have a profound influence on its information needs. Thus there will be significant differences in the organisation and scope of the special libraries appropriate to serve for instance,

- an international pharmaceutical company with a history and continuing objective of research on new drugs
- a small engineering company making specialised parts for sale within UK to the motor industry
- a research association covering a branch of the chemical industry

It follows that in times of economic stringency the view of an organisation on the relative importance of its library services will be, to some extent at least, dependent on the nature of its business. Thus the pharmaceutical company might decide to intensify its research—with high information needs—in order to 'invent' its way out of the current difficulties, the engineering company might decide that its technology and product range must remain fixed and that it should cut its overheads—including its S & T-oriented library services—as much as possible to keep prices down and increase its competitiveness, the RA might be heavily dependent on its member companies' views of their needs and be constrained to maintain, or reduce, its library services accordingly.

Whether or not these are accurate descriptions of what is happening now in real situations is not important. The point I want to make is that since the nature of an organization—industrial company, research association or whatever—has a strong influence on its information needs and therefore on the special library service it will be able to justify, in favourable or adverse economic climates, there is no one answer to how we in special libraries should respond to changing environment. However I do believe that there are guidelines that are worth consideration by all.

4.3 *Location, organisation and management attitudes*

As Martin White pointed out recently⁷ special libraries in most cases were initially established in R & D Departments. Indeed, Information Science originated and developed within science and technology. Thus for valid historical reasons a high proportion of special libraries, at least in science and technology oriented industrial companies, report to the Research Manager or Director.

Whether or not the needs of the research staff should dominate the work of the special library will depend on the nature of the Company's business, as I pointed out a few minutes ago. I do agree, however, with Martin White that an information unit devoted solely to research information is likely to be very poor at identifying useful published information for commercial or other functions. There is a danger also that the special library which is located in the Research Department will be seen, by higher management and non-research staff, as existing solely to serve the research staff, especially as far as its information activities (as distinct from simple provision of books and periodicals on the library shelf) are concerned.

Speaking at the Aslib seminar 'Information in the 1980's' in May 1976⁸ Sir Monty Finniston pointed out that people who will be concerned with information management

in the 1980's will find themselves dealing with a subject that by then may well have become the main 'commodity' of a complex society. I believe that we are already in that situation, and have been for some time. The increasing complexities that face us in the changing economic, political and social environment have made their own contribution to the information explosion, an explosion that embraces not only volume, but also fields of publication. You have to look only at European legislation, and health, safety and the environment to understand what this means. Now the industrial manager faced with a need to make a policy decision cannot do so without considering all aspects—scientific and technical data on the manufacture and performance of his product, commercial and market information on customers and competition, health, safety and environmental factors and legislation, and so on.

This theme, of complexity and the emergence of the 'post-industrial' or 'information society', has run through a number of debates, seminars and published papers in recent years and the growing importance of non-scientific and technical information has been recently recognised—some might say belatedly, but nevertheless to be welcomed—by a change in the Memorandum of Association of the Institute of Information Scientists, where this formerly referred to 'scientific and technical Information Work' it now refers simply to 'Information Work'.

What are the consequences of this growing complexity and development of the 'information society'? At the Aslib seminar 'Information in the 1980's' we identified four propositions and associated action points,⁹ which for me still, some four years later, sum up what I believe to be appropriate. These are

- (a) The professional image. The unity and pride of the profession needs strengthening, so that its rightful influence can be exerted when it matters.
- (b) The managerial image. The profession must improve and demonstrate its managerial ability in directing its communications, selecting, commenting, and undertaking its role vis-a-vis its colleagues' functions.
- (c) the technological stance. Technology must be mastered, information must not be a slave to black boxes. Some technology may be redundant.
- (d) The information function. Information should become a corporate function (cf Personnel, Finance) however organised in detail.

All of these are important but the crucial one is the last. There are different ways of interpreting what is meant by describing information as a corporate function. For me it does not imply that all the separate information units within an organisation must of necessity be welded into one under a single manager. It *does* mean that those who are responsible for managing the various information units (S & T, commercial, MIS, and any others) in the organisation must, each separately and all together, have a deep understanding of the needs of the organisation for information, and work together to ensure that those needs are most efficiently and effectively met, by co-operation or amalgamation as may best suit the situation.

4.4 Manager and staff

This brings me to the last of my factors, the manager and staff of the special library. Peter Drucker, the American management consultant and one of the world's most prolific thinkers and writers on management, identifies four common weaknesses of

managers,¹⁰ of which I choose two as relevant to tonight's theme. The first is that often managers tend to be work and effort focused, rather than contribution and result focused. Asked 'what do you do that explains your being on the payroll', the manager of the special library might answer 'I have 20 library and information staff working for me and each year they buy 500 books and 350 journals at a cost of £50,000, and answer 20 enquiries each day'. As Drucker points out, that is a degenerative and curable disease—the staff and budget can always (and probably will) be cut significantly. Rarely do you get the manager who says 'it is my job to think through the decisions our management will have to make in the next year, and make sure they get the information they need'.

Managers' second weakness, according to Drucker, is their failure to concentrate their efforts on key areas. The need to concentrate, to set priorities, is something that managers do not like. In a sense, in the librarianship/information field this is an understandable consequence of the natural tendency of anyone who is motivated to enter a 'service' profession, to wish to give his customers as full a service as possible—a tendency that is nurtured in training. However valuable this motivation may be, the manager must put it in perspective and while using it constructively at the same time set his priorities and concentrate his resources in key areas.

Sir Alastair Pilkington expressed it another way at the 53rd Annual Conference¹¹ when he said 'an information service will only be good if the professionals who work in it come out among their customers and make it so. They will make it good through creating partnership with their customers in order to help identify, understand and meet their needs'. Success in a company is better decisions resulting in a better company. Professional skills and techniques in information work do not represent success in themselves. They must be a means to the end of better decisions, and the only way for information providers to contribute to better decisions is by coming off the touchline and joining the team that has to make them'.

5. How should we cope with the threat?

How do we interpret this in the context of economic constraints and the threat of cuts?

I fear that too many managers and staff in special libraries are, as Peter Drucker puts it, work and effort focused. They concentrate on the tools of librarianship and information science, on placing a comprehensive range of books and periodicals, fully indexed in an immaculate system, and correctly labelled on the library shelves, on operating a highly efficient loans system, on carrying out comprehensive literature searches and providing bigger and better lists of references—*when asked*. Let me remind you of my text.

'He who makes chaff of himself
the cows will eat'.

Those people that I have just described have made chaff of themselves and when the cows (with due apologies to senior management) are hungry for cuts, they will be eaten.

A very different picture emerges when the manager of the special library has the vision to see his job as it should be. He will then think through the needs of his

company for information to ensure that the right decisions are taken. He and his staff will be constantly out amongst clients—in all functions of the company—working as colleagues in a team effort to solve their information problems. He will be constantly looking forward, estimating what the future might bring in terms of

- changes in the environment (the economy)
- changes in the Company's range of activities
- changes in the technology of information processing

and planning the development of his resources—staff, money, equipment and systems—to ensure that he continues to meet his company's needs.

At the 'Information in the 1980's' seminar Don Spratt said¹² that the conference had not given enough thought to—'the continuing need to reduce staffing levels into the 1980s. Information managers complain that they have staff cuts visited on them in an arbitrary way. It is their own fault. Every manager should seek to optimise the staff level of his unit in order to maximise the efficiency of the total organisation. This can be done in a creative way, enriching and raising the status of the jobs'.

Let me again ask the question—how should we, the management and staff of special libraries, respond to the threat of cuts? My answer—I believe the only real answer—is a long term one.

If you are faced with serious cuts it is already too late. The manager of the special library should see his job as I have just described it. Then he will be constantly in tune with the organisation's *needs* for his library's services, and constantly tuning those services to the needs. In this way of operating he will be continually in touch with the higher management who will have confidence in him and his plans for his unit. In this situation sudden imposed cuts in his resources are extremely unlikely. The worst he might face is encouragement to increase the tempo of any change in the level of his resources which he has already planned.

6. Conclusion

In conclusion, may I use another of the consultant Peter Drucker's sayings¹³ to convey what I hope I have achieved in the last 45 minutes:

'If a client leaves this room feeling he has learned a lot he hadn't known before, he is either a stupid client or I've done a poor job. He should leave saying, I know all this—why haven't I done anything about it?'

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Manpower planning and research

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This article is based on a background paper given to a discussion group at the Library and Information Research Group Workshop 'Exploiting Research' at Huntercombe Manor, 23 June 1979.

POSSIBLY THE BEST entry point or initial approach to manpower planning is via term-definition. Perhaps we should also keep this term-defining concept in mind whenever we think, talk, or write about the subject, because the very label manpower planning in itself is ambiguous and capable of multiple interpretation. It attempts an encapsulated description—indicative rather than precise—of a faceted discipline or multi-disciplinary field. As an activity it has four broad aspects: stocktaking analysis; forecasting; planning and policy making; implementation.

Manpower planning concerns how to recruit and deploy, develop and use the human resources at our disposal. The initial stage of the process is very much a present-tense affair. It involves stocktaking the labour force and describing or modelling its nature. Although essentially a descriptive, rather than a predictive or prescriptive exercise, results should not be undervalued in their own right. If one went no further than this, one would have achieved something useful. Stocktaking information is not just fodder for the forecasting processes which follow. Descriptive models can provide valuable managerial insights into what is going on now. Comparison with any material collected in previous years may also indicate the development of trends in desirable or undesirable directions. So one of the first building blocks towards exercising control over events has been laid down—the existing system has been described in quantitative terms. To control events effectively some measure of understanding of their nature is necessary. On a common sense basis, most of us have learned that it is hazardous to intervene in situations, unless one has a pretty good idea of what is (and has been) going on.

Stocktaking exercises and descriptive models however tend to illuminate at best only the short term future. The next stage of manpower planning goes beyond this. Armed with facts about the present, one now looks to the future and attempts to answer questions like: 'What might happen when . . . ?' or 'What might happen if . . . ?'. Forecasting is concerned with anticipating future needs and the resources likely to be available to meet them—in other words, with manpower supply and demand. Supply and demand forecasting is most usefully carried out under a variety of different assumptions about external influences. It may be done for the short-term, the medium-term, or the long-term future. Sometimes (as in the case of the Health Service) forecasting is done for all three terms.

Forecasting is a much misunderstood and therefore much maligned aspect of manpower planning. If we understand and firmly retain the idea that forecasting is neither a magic window opening onto a deterministic future, nor time travel via statistics, nor oracular prediction, we may be able to make better use of what forecasting really has to offer. All that forecasting of, say, supply and demand, claims to do is to tell us 'What might happen if . . . ' *not* what will happen. But—'what might happen if . . . ' is very useful and valuable information. It means that employers and planners are not caught totally unprepared for what the future may bring. They can make plans to meet a range of possible or even probable future events and situations in as sensible a manner as possible.

This leads on to two further aspects of manpower planning—policy making and implementation. Policy making is concerned with taking an active hand in shaping the future. Forecasting having revealed 'what might happen if . . . ' and various possible futures, policy makers can then opt for a desirable direction of future and see what steps need to be taken to give it the best chance of actually happening.

Implementation of a resulting manpower policy and plan is certainly the most difficult area of all—because of the individual human right of veto, and because powerful vested interest groups always exist to oppose the implementation of what seem to be rational plans for the good of the majority. It should also be noted that broad manpower policies and their implementation have profound practical implications for education and training and for the institutions providing this facility for an occupation or industry. In fact without the co-operation of educators and trainers, any manpower plan or policy is doomed from the start.

Having distinguished or artificially separated four different sub-activities within manpower planning—stocktaking, forecasting, policy making, implementation, let us now look at manpower planning from another angle. Planning, forecasting, and policy making and execution can take place at different *levels*.

- 1 *The macro level*—national and international. This usually concerns the national labour force, the work force, or even the population as a whole. It includes demographic and economic forecasting and planning. Macro planning is not always restricted to the individual nation. International studies are sometimes necessary—e.g. within the European Economic Community.
- 2 *The medium level*—this represents what is often called the industry or occupational level. It is concerned with specific isolated segments of the labour force, with for example people employed by the engineering industry or in civil aviation—or in a particular occupation—for example nurses, pharmacists, teachers, librarians. Again, however, this is normally done on a nation-wide basis.
- 3 *The micro level*—the local and individual organization level. Local area studies and company manpower planning belong here.

These levels have relevance to our involvement—actual or potential—in manpower planning, because although the ultimate aim (of an integrated manpower strategy) is the same for national, occupational and individual company planning—problems and methodologies arising can be very different. So, in any discussion of the subject we need to keep clear, in our heads and in our speech, whether at any stage we are talking about manpower planning for our profession as a whole, or for various

segments within it (for example public libraries as opposed to industrial or academic), or about planning and forecasting for specific libraries or services. Otherwise we risk semantic muddle, consequent conceptual confusion and failure in communication.

Ideally of course the whole manpower planning process should be inter-related and inter-informed from top to bottom level. All should be part of an integrated manpower strategy, or management information system for sensible and consistent decision making at any level. In real life, however, the component parts and levels of the total manpower planning system get separated. Often they have different inbuilt aims and problems—even though the common aim of all forms of planning is ultimately to balance the manpower supply and demand ratio. Different aims arise because forecasting and planning have ethical and political aspects. The aim will be different if, for example, you are a manpower planner for a trade union, a government agency or a large industrial complex.

To return to the inter-relationship of the manpower planning system at all levels. One might think that the top or macro level of national economic forecasting and planning has little to do with occupational or company forecasting. This is not true. Macro forecasts and national policies provide the scenarios for occupational and company forecasting. Forecasting for an occupation or a company is not a neat self-contained activity, it must be set in the context of the external influences operating upon it, which condition both supply of and demand for manpower.

An example of the operation of both external and internal factors is turnover rate or labour stability within an organization. Many economists argue that this will be primarily determined by external economic conditions and general employment levels—particularly local area levels. Employees act more cautiously in periods of recession and high unemployment. The proportion who are prepared to leave jobs impulsively without finding another job first decreases. Fewer other jobs outside are in any case available. This cuts down on movement amongst their more careful colleagues who will not move except to a bespoke destination. All this reduces the mobility potential of current staff.

Incoming employees are affected by these factors, plus a few more. With higher unemployment levels, employers may be able to be more selective in recruiting, as they can pick and choose from a larger number of probably better qualified candidates. They can also reject any whose past employment record shows 'instability'—i.e. random, irresponsible mobility, and this may lead to even greater labour stability within the firm. However, the turnover rate of individual firms studied in such adverse times will still show individual variation—dependent on internal factors or influences within the firm concerned. Pay levels, conditions of work, career structures, training provision are among these influences. The structure and nature of the company workforce as a group of people also affects turnover rate—e.g. an older workforce, a young workforce, a primarily male or female workforce.

Manpower planning has a formidable scientific or mathematical basis or bias. Its origins are in operations research, and many of the tools used are firmly science or statistics based in concept and method. It should not however be thought of as a 'hard' scientific discipline. Taking that naive attitude towards it reduces a useful mixed discipline to the status of pseudo-science. Actually, planning and forecasting have legitimate subjective as well as objective aspects—particularly on the demand side of

the supply: demand ratio. The interpretation of forecasts and the policy decisions based on them are essentially subjective. Even the correct selection of factors as relevant for inclusion in statistical forecasting is a subjective exercise in perception and judgment. In short, manpower planning is really multi-disciplinary, involving close co-operation between statisticians, economists, sociologists and management experts.

Manpower planning is currently a very trendy discipline. It gathered speed in the early 1970's and really took off after the formation of the Manpower Services Commission in 1974. A large number of institutions are involved in the game—the Manpower Society for example formed in 1970 had about 400 members (institutional as well as individual) at the time of writing, which is indicative of widespread involvement.

Of course manpower planning has been around in a recognizable if less coherent form, for far longer than this. In a widespread but fragmented way it has been increasingly visible ever since the industrial revolution. Firms had recruitment plans and policies, training and re-training policies and pay policies, but these tended to be discrete unrelated concepts and activities. What is new and characteristic of the 20th century and particularly of the 1970's is recognition of the need to bring all these things into line as part of a consistent and unified manpower strategy oriented to future development.

Realization of the need to in some way plan for and control large groups of people goes back much further in time and is probably as old as organized society itself. Possibly many early attempts were strong on the exploitation and control aspects but relatively weak on the personal development and career provision aspects. Nevertheless some concept of manpower planning must have preoccupied Roman military leaders and feudal barons.

An early concrete example of manpower planning in action is provided by the pyramid building Pharaohs. In retrospect we tend to feel very sorry for the labour force toiling at the work-face of this to us rather pointless activity. Pharaoh emerges as a heartless ego-tripper. The truth is rather different. Return to their frame of reference and pyramid building is about the most important construction project you could imagine. The after life was an important reality in those days for anyone. Pharaoh was not just anyone—he was a God incarnate. So a pyramid must be accepted as a top priority project. We tend to imagine that the workers were honest citizens or slaves forced to this labour. This also is not quite true. The workforce contained a mix of seasonally unemployed farm workers, prisoners of war and convicted criminals. Instead of executing members of the last two groups (as many rulers of that time might have done) Pharaoh put them to what he considered honourable and useful work. Cruelty—or intelligent avoidance of manpower wastage. The Ancient Egyptians also believed that the important dead should be accompanied to the afterworld by servants, craftsmen, musicians, dancing girls and fast horses. But long before their contemporaries, the Egyptians abandoned the custom of actually killing people (or even domestic animals) for this purpose. Instead little symbolic statues of various kinds, accompanied where appropriate by tools of trade, were placed in niches in the tomb. Around 2800 BC the Egyptians decided that using the real thing was not only inhumane, but rather a waste of skilled manpower.

The Chinese of the 7th century BC showed a similar awareness of manpower

planning potential. A poem from that time by Kuan Chung Tzu tells us:

'If you wish to plan for a year sow seeds
If you wish to plan for ten years plant trees
If you wish to plan for a lifetime develop men.'

Allegedly organized manpower planning was first introduced to the Western world in 1676 by Samuel Pepys of diary fame, when he was Secretary for the Navy. In this post he became concerned about providing career progression and some sort of rational promotion structure for British naval officers. An early example of a job creation scheme was provided by Sir Francis Dashwood. Possibly some readers have been to the Hellfire Caves and know all about the orgies that went on there in the 18th century. Sir Francis must have been a strange and complex man, because did you also know that the work of excavating the Hellfire Caves was undertaken (or rationalized) to provide work for the unemployed poor of the parish—i.e. job creation?

The analytical and predictive aspects of manpower planning were however relatively neglected until recent times for two very good reasons. One is conceptual, the other technological. The conceptual reason or barrier to trend analysis and forecasting involved a prevailing climate of inhibitive thought and an intellectual blockage, later followed by an intellectual breakthrough. As a resource, to be planned for and predicted about, human beings are difficult, particularly at the individual and small group level. Prior to this century rationalists tended to think that scientifically based analysis of human behaviour was pointless, because of human free will, irrationality, emotionality and general unpredictability. It is true that *homo sapiens* is one resource that has the right of veto to well-laid plans for its utilization and distribution.

But perhaps that statement could be amended or widened to include any kind of living resource in direct proportion to its IQ, physical strength and personality development? Because in fact the breakthrough in realizing that you could analyse human behaviour, discern trends and make some predictions, for people in the aggregate, if not individually, came via horses. Apparently German cavalry regiments were in the habit of keeping meticulously detailed records, of just about everything that happened. Wastage flows became evident in these records. The cause was exercise of a right of veto by Hohenzollern cavalry horses. The distribution of rebellion or opting out by deliberately killing a disliked assigned rider was not unlike that of walk-out rates by factory workers of the time. *Modus operandi*—a well staged accident, and a well-placed strategic kick, were remarkably constant, as were certain associated factors of reported mismatch, or not seeing eye to eye on basic topics, between horse and rider. Distribution of such incidents could be traced and trends projected into the future and predictions made about future incidence.

If you can discern patterns in horse behaviour in the mass—why not in man—allegedly more rational and intelligent than the horse? A whole new field of the application of statistical techniques to human resources opened up, in theory at least—because prior to the development of the computer, statistical handling of mass data (like population analysis and projections) was expensive and time consuming. History was liable to overtake forecasting in consequence. The development of the computer represented the second breakthrough, providing the technological means for manpower analysis and forecasting as we know it to emerge.

It will be evident, even from these arbitrarily selected but not irrelevant historical anecdotes, that this is a very mixed discipline or field of activity, with subjective and behavioural as well as objective and scientific or mathematical aspects. This necessary duality is possibly the most important concept to understand and retain—for anyone directly concerned with or being indirectly affected by manpower planning and forecasting. This has implications for research in the area. Both qualitative and quantitative research can and does feed into manpower planning.

To give a concrete example—take the subject of wastage from the labour force. A quantitative study of wastage flows would be useful to manpower planners. It would show from which parts of the system people dropped out, and at what rate or in what numbers. But a qualitative study might be equally useful, or complementary—say a study of factors affecting wastage. The quantitative study would define the size and shape of the problem; the qualitative study would define its nature and cause.

This example may indicate how research workers in our field might usefully contribute to manpower planning. It seems to be an area in which they *should* get involved, for several good reasons. It is an area in which background research can contribute directly and practically to planning and forecasting work—at both the national and the local level. It is an important area. It concerns real things in the real world. It concerns people—the future of the profession, of our practitioner colleagues and their users. The issues involved matter—they are not of purely academic or theoretical interest.

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The matching of resource to service in an industrial information unit

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An industrial information unit must undertake certain activities to meet its customers' needs. The paper discusses these activities and places them in an order of priority. The resources available to a small, medium or large information unit are matched against the activities. The major activities, in order of priority, are considered to be (1) customer liaison, (2) special collections, (3) internal reports, (4) current awareness, (5) retrospective searching, (6) system development, (7) external literature data base compilation.

Introduction

I WILL BEGIN this paper with the truism that the purpose of an industrial information service is to get the right information to the right person at the right time at the right cost.

Stated in this form, the purpose or goal of an industrial information service appears quite straightforward but if we look at what it involves in a practical, real-life, work environment we will see that it is much more demanding than is immediately apparent. If we consider the implications of the individual terms from the statement 'the right information to the right person at the right time at the right cost' we find that in both small or large industrial information units in order to meet this objective many requirements must be met, e.g.

Right information—requires (1) contact with the customer to know his requirements, (2) an understanding of the subject, (3) knowledge of the coverage of the literature containing that information, (4) removal of redundant and irrelevant information, (5) possible previous compilation of that information, (6) a facility for extracting the information.

Right person—requires knowledge of (1) company's organization, (2) who are the gatekeepers, (3) who is working on a specific topic, (4) who will use the information, (5) who will spread it further, (6) whom will it influence.

Right time—requires knowledge of (1) who needs information immediately, (2) who needs a low priority background literature search, (3) who is facing a specific problem

Right cost—requires knowledge of (1) the value of the information to the customer, (2) the cost effective way of providing the information, (3) the proportion of the budget one can devote to it

This is what is required in order to provide the right information to the right person at the right time at the right cost. In order to meet these requirements the information unit must undertake many activities, the major ones being

- Customer liaison: to ensure the right information is obtained and provided to the right person
- Background reading: to ensure an understanding of the information required.
- Data base compilation: this can be in-house data base compilation (referred to in future as Reports Collections) or external literature systems; they provide a store of the required information.
- Special collection compilation: these will be referred to in more detail in the paper. They are special collections of literature, data, or other information compiled to meet very specific information needs. The collection may be of in-house information, external information or a combination of both. Their compilation provides a store of the required information.
- Current awareness: the whole gamut of current awareness operations is involved in getting the right information to the right person. Information bulletins, automated SDI, journal circulation, etc.
- Retrospective searching: of in-house or external files in order to obtain the right information.
- Cost comparisons: current awareness notification, retrospective searching, data base compilation, can all be achieved by differing methods and the cost effective method should be used.
- Budgetary control: no information service has unlimited funds and so decisions on what services to provide are influenced by budgetary considerations.
- Systems development: new information requirements may bring new systems requirements.

If we ignore 'background reading', and 'budgetary control' as being relatively small in demand on the manpower resources available to an information unit and 'cost comparison' as it is an occasional activity we are left with the major activities an industrial information service must consider undertaking in order to meet the objective previously stated. The activities are

Customer liaison
Data base compilation
Reports collections
Special collections
Current awareness
Retrospective searching
Systems development

Implications in a small or large unit

Fig 1 shows a simplified picture of the implication on manpower resource of these seven activities. For simplicity a comparison has been made between a small one-information scientist unit and a larger seven-information scientist unit.

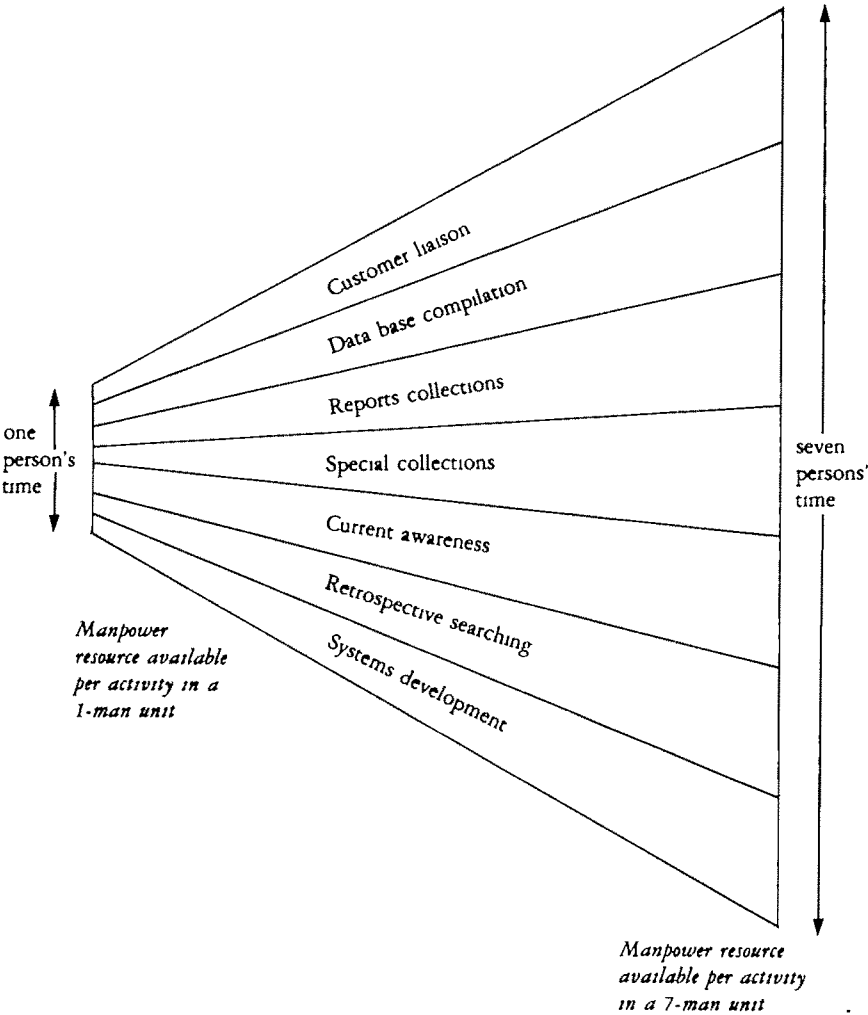


FIG 1 *Diagram of possibilities*

If you look at this diagram of possibilities you will see that it is obvious that the small unit cannot tackle all these activities. The information scientist would be spending only 1/7 of the time available on any one activity and this amount of time is so small as to render it impractical for most of the activities.

Even a larger unit with seven information scientists should seriously question whether or not it can undertake all the activities. The equivalent of one information scientist's time being spent on an activity such as data base compilation would seem inadequate. Therefore there must be an assessment of priorities.

Throughout this paper, the decisions on what priority to give to services to be offered to customers are based on customers' needs and the means of satisfying these needs. If the customer can satisfy the need himself, albeit reluctantly or inefficiently, then the provision of a service by the information unit to meet that need is given lower priority than a service which meets a need a customer cannot satisfy himself. This does, of course, ignore the aspect of the value of the information. It could be argued that an information unit should concentrate on providing the information of the highest value rather than the information a customer cannot retrieve himself. The drawback to this approach is that it leads the information service into the area of value judgement of the information. This is a highly complicated area and it is unlikely that anything other than a very large information unit could devote sufficient resources to investigate the value of the different kinds of information to its customers.

Priorities

I am going to discuss a situation where the decisions on what an information service should offer can be made on the basis of information philosophy and information resources. The existence of an information service of any kind obviously influences how such a service will develop. Customer demands and loyalty are influenced by what is already provided for them and must be considered if changes are proposed.

Therefore I am going to talk in terms of an imagined greenfield situation in which an information service is to be introduced where no information service has existed before.

I am also going to assume that, for the purposes of the discussion, a library function is included within any information service, of a size pro rata to the number of information scientist staff (e.g. 1 information scientist probably supported by 2 clerical staff operating the library routines and typing, etc., 7 information scientists, probably supported by a librarian and 3-4 library assistants). But I am not going to discuss library-type activities.

So what are the priorities in an industrial information service?

I would argue that they are the same in a small unit or a large unit. A small unit cannot perform all the activities that a larger unit can but the order of priority is the same. Should the small unit grow then the new services it offers will be the next in this order.

In my opinion, and based on my earlier comments, the major activities isolated in the earlier discussion are the essential activities and should be given the following order of priority. No weighting to the activities or their order of priority has been given as I believe it is a true, and definite order.

First priority, customer liaison

It is difficult to see how any information service can operate effectively without good customer liaison. How, for example, do you draw up an order of priorities for services to be offered if you don't first consult your customers? How do your customers know about your services if you don't tell them? How do you keep abreast of their changes

of interest, know how your service is being received, discover information needs, without customer liaison' I believe there are two approaches an information service can adopt (a) the active approach, (b) the passive approach

The active information service uses its resources to take the information service to the customer, produces current awareness tailored to his needs, provides information to him when required. The passive information service uses its resources to develop information systems for the customer to use. It does not provide the information but provides the means for the customer to obtain the information. There is usually a compromise between the two approaches but in both cases, customer liaison is essential.

If there is one criticism the information profession has always been open to it is that it does not liaise closely enough with its customers. Only recently an Aslib paper¹ referred to information units which provided current awareness to customers who had changed their subject interest and who did not want that information and even cited cases of information bulletins still being produced on topics years after the organisation had ceased to work in that area.

Customer liaison is fundamental to any information service and an information unit which does not frequently consult with its customers must be an inefficient and ineffectual unit. Incidentally, customer liaison brings good customer relations and hence favourable feedback to management.

Second priority, special collections

It may be a surprise to many to see this activity given second priority but there is a need in most companies for special collections of literature or data. The need for the information may or may not be greater than for current awareness or literature searching but these latter two activities can be achieved to some extent by the individual himself whereas this is rarely the case with special collections.

I can give examples from personal experience of such collections for small and large information units.

1. In the Reactor Development Division of the United Kingdom Atomic Energy Authority it was essential that the details of the wide variety of nuclear reactors being constructed throughout the world should be known by the R & D staff. This information was scattered through scientific journals, conference proceedings, scientific reports, etc. The information unit set up a system for collating all these facts from the various sources and in due course it became the most heavily-used and most appreciated of the services provided.
2. In the pharmaceutical industry novel compounds are synthesized at a considerable rate and at considerable expense. Information units in most pharmaceutical firms have compiled chemical structure indexes to these compounds and chemists check with the information units before synthesizing new compounds in order to avoid expensive duplication.
3. In the friction material industry a company had many test reports on friction materials but found it difficult to correlate the properties such as friction level, wear, noise, fade characteristic, etc. The one-man information unit set up a system storing this information on post-coordinate feature cards.

These are just three examples from an infinite variety of special collections in existence. What they all have in common is that they bring together in one place information the customer cannot collate himself.

Customer liaison should highlight these needs for special collections (lack of customer liaison will not!) and once established they will assist in enhancing the information service's reputation by being a facility that is both essential and well-used. Of course, although it is unlikely, a need for a special collection may not exist within the company or it may be answered elsewhere in the company.

If a need for a special collection is identified then consideration must be given to the resources which can be devoted to it. In a small unit this will be a part of one-man's time, perhaps with clerical help. It is therefore pointless in such a situation to aim to construct a very large special collection or to construct a small one with sophisticated systems. If the need for the special collection is desperate but to satisfy it absorbs all the resources of the information service, then this should be seriously considered. If the information service satisfies a desperate need for information it is completely fulfilling its role. The information needed does not have to be in the traditional form of periodical articles, literature search results, etc. Information is information and its source and form is of little importance, it is the customer's need for it that is important.

In the case of a large information unit special collections lead to the probability of specialisation within the information unit. Usually one or more information scientists will be delegated the responsibility of developing and maintaining a specialized collection. Examples of this are plentiful such as the sophisticated chemical structure records systems of compounds synthesized in pharmaceutical companies, or the handling and storage of data from field trials in the agricultural area. These are systems which could not be developed within a small information unit without virtually the total expenditure of the unit's manpower resources on the activity.

Third priority, the reports collection

The term 'reports collection' is meant to include any kind of centralized filing system for in-house documents, be they reports, memos, laboratory notebooks, proforma, etc. The essential factor is that the document is an in-house document rather than one from the published literature. Again, I expect that putting the reports collection so high in the priority rating will surprise some people. My justification is that the information generated within a company is axiomatically the most relevant to the company. Therefore access to it is essential. It can be argued that in the research division of a company the only thing produced by the research is information. Now if the research division spends £5m p.a. on research which is written up in laboratory notebooks and if 500 laboratory notebooks are completed each year it can be argued that the average value of those laboratory notebooks to the company is $5,000,000 \div 500 = £10,000$ each. This is grossly over-simplified but it does indicate the value of in-house information.

Another, more pragmatic, indication of the value of in-house information can be deduced from the evidence that it is not unusual to hear of information services being cut back and having to stop producing their information bulletins, buy fewer journals, or even close down altogether but it is rare to hear of an instance of a company

closing down its in-house documentation collection!

In-house document collections do not appear to be used very frequently and hence are lowly-rated as an information resource. However, if you consider that an in-house document collection probably consists of a few thousand documents whereas the world's literature consists of several millions of documents, the frequency of searching the external literature should be much greater than the frequency of searching the in-house document collection to give the same rate of use of individual documents within the collection.

A small information unit is unlikely to be able to handle all the documents generated by the organization but may be able to select the vital class of document. Discussions with customers (n.b. customer liaison) will highlight important documents which will tend to be those that have been expensive to produce such as laboratory notebooks, market survey reports, progress reports. The small unit can be the central repository for such documents and can produce indexes or catalogues for them. They will probably be simple 5"X3" card indexes or even perhaps feature card indexes but it would be unusual circumstances which enabled a small unit to provide on-line interrogation of an in-house records system. For a large information unit the development of sophisticated in-house document systems is a possibility, and given the appropriate size of collection, even may be essential. As with the special collection, one or more information scientists within a large unit may be given the specific responsibility for the system development and maintenance.

Fourth priority, current awareness service

I have deliberately chosen the term 'current awareness' as opposed to the selective dissemination of information (SDI) because it is all-embracing. In a small unit it may not be possible to be selective in the dissemination but still be possible to provide some form of current awareness notification

Current awareness notification achieves three results

1. it notifies customers of developments in their area of interest,
2. every time the bulletin or print-out or photocopy providing the current awareness lands on the customer's desk it advertises the existence of the information unit, and
3. it makes the information scientists maintain an awareness of developments within the organization in order to be able to provide the service (n.b. more customer liaison required). Current awareness can be provided in a variety of forms. If a small information unit still has some resources left over after meeting the first three priorities it can use these resources in providing current awareness but must choose the form consistent with its resources. This also applies to a large information unit but obviously there must be more options open to a large unit than a small one. A large unit can also set up a small working party to study which is the best approach to take but a small unit must make the same decision with far less effort available to devote to the decision-making process. Whatever method is chosen it should be chosen as objectively as possible.

I would like to digress briefly about 2. The appearance of the publications that an information service presents to its customers is important in creating the right

impression of the service. Thus, if a regular bulletin is to be produced care should be taken to ensure that it looks professional, is easy to read and is easily identifiable as originating within information services. This does not necessarily mean a 'glossy' publication. A one-man unit may have to use a cut-and-paste approach to producing a bulletin, run off copies on a poor quality photocopier and incorporate different types of information. This does not preclude care being taken in the overall design, layout and aesthetics of the bulletin and it should be possible to have a batch of smart, well-designed front covers printed, using colour, which carry the information service's address and telephone number for a low cost.

The same care should be taken with any other documentation which the customer may meet. Literature searches should be presented neatly and large, unsorted on-line search printouts should be avoided at all costs. Care in presentation should be taken even with library forms, circulation slips, etc. It takes little extra effort and virtually no extra cost to produce a neat search result or a well-designed form and although the customers may not appreciate good design they most certainly will react against poorly presented material.

Selection of a current awareness system

I would like to refer to a simple way of selecting a preferred method of providing current awareness from a variety of methods. I make no apology about the crudeness of the methodology because it epitomizes the situation most information scientists in small units find themselves in when making such a choice. It is rare to find a unit with sufficient resources to thoroughly investigate and compare systems and services. More often the choice must be made on the basis of very limited information. A more detailed account of the technique to be discussed is given in Ref. 2. This article illustrates the technique being used in an application other than current awareness techniques and it is envisaged that it could be used in choosing alternatives for any of the functions considered in this paper.

Let us consider five alternative ways of providing a current awareness service to the customers of an industrial information unit.

- 1 a titles-only weekly information bulletin,
- 2 a weekly information bulletin containing abstracts,
- 3 SDI titles-only from a commercial service, e.g. UKCIS, ASCA,
- 4 SDI with abstracts or equivalents from a commercial service, e.g. UKCIS macroprofiles, Ringdoc thematic books, Predicasts' Predi-briefs,
5. SDI titles-only from on-line data bases run in-house.

Consider that discussions with customers have shown that they are operating in a very competitive environment and timeliness of information is very important; that they find abstracts more convenient than titles-only and they expect high relevance; and that there is a large number of customers for this information (n.b. customer liaison yields this information). Therefore, when comparing the five methods of provision of current awareness there are six main parameters to consider (1) Timeliness, (2) relevance, (3) customer convenience, (4) suitability for a large number of customers, (5) cost, (6) staff resource involved. A matrix can be drawn up, as in Table 1, of the parameters to be considered and of the alternative means of providing current

awareness. Given that each parameter is of equal importance, scores increasing from 1-10 can be given to the various alternatives depending on how well they meet the parameter concerned.

Comparison of the five alternatives could give the result indicated in the table in which case a titles-only weekly bulletin would be selected as the appropriate method of the provision of current awareness.

TABLE 1 *Current awareness provision*

Parameter	Titles-only bulletin	Abstracts bulletin	Alternatives		
			SDI titles-only	SDI abstracts	SDI on-line titles-only
Timeliness	8	2	4	4	6
Relevance	8	8	4	3	6
Customer convenience	3	8	2	7	2
Suitability for large no of customers	8	7	3	3	4
Cost	4	2	7	7	6
Staff resource	4	2	8	8	6
Total	35	29	28	32	30

Space does not permit a justification for each score and the table is only intended to illustrate the methodology. However, to clarify it a little further, under the parameter of 'timeliness' a weekly, titles-only information bulletin produced by scanning journals on receipt in the library would be very up-to-date and would score well whereas a bulletin with abstracts would score poorly as the act of abstracting delays the dissemination of items considerably. Under the parameter of 'staff resource' either form of bulletin would require considerable information staff resources and so would score poorly whilst SDI from commercial services would make much less demand on information staff time and so would score well.

The scoring in Table 1 reflects the situation in a medium or large-scale information unit. In a small-scale unit, the manpower available to provide current awareness is extremely limited and the financial resource is also small. Therefore, these two parameters outweigh the other parameters in this situation and the scoring must be weighted accordingly. This gives a different result as shown in Table 2 where the parameters of 'cost' and 'staff resource' are given twice the importance of the other parameters.

The most suitable method of current awareness notification is indicated in this case as being abstracts from a commercial service such as UKCIS macropfiles or Rungdoc thematic booklets or Predi-briefs. These publications are produced for a wide market and so cover relatively broad topics. Their advantages in a small information unit are

TABLE 2 *Current awareness provision, adjusted scores*

Parameter	Titles-only bulletin	Abstracts bulletin	Alternatives SDI titles-only	SDI abstracts	SDI on-line titles only
Timeliness	8	2	4	4	6
Relevance	8	8	4	3	6
Customer convenience	3	8	2	7	2
Suitability for large no. of customers	8	7	3	3	4
Cost	4 (8)	2 (4)	7 (14)	7 (14)	6 (12)
Staff resource	4 (8)	2 (4)	8 (16)	8 (16)	6 (12)
Total	43	33	43	47	42

(a) they are cheap, (b) they are produced outside the unit, (c) they do not involve regular updating and assessment of the profiles. Their disadvantages include (a) they are not very timely, (b) their relevance is low, (c) only a single copy is received so they must be circulated which delays the information. Their size tends to preclude multiple photocopies.

The information scientist must assess whether the advantages outweigh the disadvantages. The crude technique of comparison shows this approach is the one to adopt but if it has such major disadvantages, should the idea of a current awareness service be dropped? The answer lies in a trial run in which the opinion of customers is obtained.

The provision of a current awareness service by an information service is highly desirable. Under the best conditions it provides an environment for customers in which new information is constantly brought to their attention and so feeds them with continual stimuli. The best conditions provide customers quickly with the full articles to which the current awareness system has drawn their attention. This can put a heavy demand on the supporting library service as it will have to provide the actual articles, or copies of the articles. Perversely, the form of current awareness service suited to the small information unit in the example above is the one which will cause most inconvenience to the library. This is because the items selected by such commercial services as UKCIS macroprofiles come from a very wide range of sources, some of them quite obscure, the vast majority of which will not be on the shelves of a small industrial information unit. This means the library will have to obtain from external sources a large proportion of the full articles of items drawn to the attention of the current awareness customers. This increases the time it takes to get the full article to the customer and also pushes up costs. An additional parameter therefore should be considered – effect on library support service.

The current awareness service provided need not necessarily be from primary journal literature. Current awareness on patents, future events, competitive products, com-

modity prices, government publications, etc. may be what is required. Customer liaison will reveal the need.

Fifth priority, retrospective searching

The term 'retrospective searching' is intended in this paper to include any activity which involves searching through past published information. The end results of such searches may be widely varying, for example, from a market survey report to a simple statement of fact. However, for large or small information units, it generally involves the use of information sources prepared by outside organizations. There are exceptions to this and some information units have prepared their own data bases of published information or have bought-in such data bases.

The provision of a retrospective searching service is relatively low in the list of priorities in an information service. The reason is that, in the past, the tools used by an information scientist to conduct retrospective searches have also been available to customers for them to do their own searches. For instance, if the information unit incorporates a library which contains index publications then customers can, and do, use these indexes. Alternatively, if the unit is so small that it does not have a library and the information scientist must visit a public library, trade association, etc. to use their resources, then equally the customer can also do that. The classic example of customers doing their own retrospective searching is in the field of chemistry. Most chemists, especially the older members of the profession, are familiar with *Chemical Abstracts* and *Beilstein*, and are well-capable of conducting searches using them and many chemists visit the Chemical Society Library in London to do searches. Therefore, if an information service does not provide a retrospective searching service, the customer can obtain the required information himself.

That was the case before the introduction of online searching of computer-stored data bases! The onset of online searching may well result in a very different situation. Information units are having to decide whether or not they can justify continuing to subscribe to hard copy versions of data bases which are also available online. For example, it is unlikely that many information units which access the *Derwent Central Patents Index* online still subscribe to their manual indexes. And if they do, why? Probably because their customers wish to use them!

It would seem obvious that, with the wide variety of data bases accessible online and the speed of searching, online terminals should exist in every information unit but it is only sensible if that unit has the resources to do the retrospective searching for its customers.

It is probable that the introduction of online searching in an information unit which does not provide a retrospective literature searching service would cause serious problems. Customers would have to be trained in online techniques and be kept up-to-date with the changes which are occurring so frequently but it is unlikely that any customer would do sufficient personal searches to maintain this expertise. Consequently searches would become both unsatisfactory and expensive. At the same time, one of the justifications for the new expenditure on online searching would be cancellation of subscriptions to hard copy indexes. The end result would be very dissatisfied customers. Online searching should be introduced only if an additional budget allocation is agreed for it, if the unit has the resources to do online searching, and if



the customers are not adversely affected by decisions resulting from the introduction of online facilities

It is very easy to underestimate the resources required to do online searching and in practice both the expenditure and the time involved can be much larger than anticipated. It is almost inevitable that online searching will increase the total revenue expenditure of an information unit. This is so even if that unit cancels some subscriptions to hard copy equivalents. The two-level pricing policy introduced by the Institute for Scientific Information Inc. (ISI) whereby subscribers to the hard copy indexes can search it online at a substantially lower charge than users who do not subscribe to the hard copy, will probably become the policy of the other data base suppliers. This negates to some extent the financial benefit of cancelling subscriptions and will also generally raise the cost of online searching.

The time spent at an online terminal actually searching the data bases is only the tip of the iceberg if online searching is to be done effectively. Over 300 data bases are accessible online and the introduction of Euronet will increase this number considerably in time. Online searchers should be aware of these data bases and must be knowledgeable about their content and their idiosyncracies. They must be familiar also with the varying operating procedures of hosts such as SDC, Lockheed, IRS, etc. and with the Post Office and the networks. A medium-sized information unit typically will have about a 10-foot shelf run of manuals concerned with online, its staff will have spent many man-hours on training courses run by the hosts or data base suppliers, and they will spend a proportion of their time each week reading the large number of 'online' newsletters which detail introductions, changes, modifications and other information essential for effective online searching. The justification for the introduction of online searching does not lie in time-saving but in the wide variety of information sources which become available on a pay-as-you-use basis, and in the improvements in search strategies made possible online.

A more effective way of conducting literature searches in a small information unit is to persuade someone else to do the search. This can be achieved by making use of external organisations to which the company belongs. For example, most research associations have a library or information service which will conduct literature searches for members, Interlab and other quasi-governmental organisations exist to help industry and operate information services, Aslib, public libraries and even other commercial firms also can be exploited in this way.

It was suggested at the 1979 Online Conference in London that, in the future, the end-users of information will do their own online searching, due to the development of more user-friendly systems. It was envisaged that training in information awareness and information systems would take place at an early stage of the education process, even possibly at primary school level. Such developments would obviously change the approach an information unit should adopt towards do-it-yourself online searching but they are some distance away. Decisions must be made in an industrial information unit within a short time frame and cannot await changes several years away.

Sixth priority, system development

Most information units of any size become involved in some form of system development but it is not implicit that system development means mechanisation. An

information scientist in a one-man unit who designs and installs a feature card system for a special collection of information is involved in system development as much as the information scientist working in a large unit on an investigation of the direct input of chemical structures into a computer file. But there is the fundamental difference in that in the first case the information scientist has a high priority requirement for which he must develop a system whereas in the second case the information scientist is engaged in speculative development work. It is this latter activity which is envisaged as 'system development' in the context of this paper.

No information system is ideal and there is therefore always room for improvement or change. The development of new systems, particularly if they are sophisticated and involve computerization, is costly and time-consuming. The fact that information units do develop new sophisticated systems is illustrated by the software packages ASSASIN, CROSSBOW, and CAIRS. However, this is definitely an activity that a one-man information unit should not become involved in and, in reality, only the very large units have the resources to devote many man-months or even man-years to such work. It does not appeal to one's pride, nor is it as intellectually stimulating, but information units should beg, borrow or buy-in developed systems rather than become involved in developing their own. The bought-in system may fall short of the ideal but the one they develop themselves will not be perfect. If no system can be obtained for a particular requirement then one may have to be developed in-house but this should be undertaken only as a very last resort.

Seventh priority, data base compilation

The construction of data bases of published information for in-house use has been a common activity in all sizes of information units. The contents of regular in-house information bulletins have been stored on 5"X3" cards, aperture cards, computers, abstracts of patents have been written, indexed and stored, and many other such data bases have been compiled. The resources involved have been considerable. To set up a data base of published information is to give birth to a monster which will grow and grow as the literature proliferates. Fortunately, the availability of a wide variety of commercial literature data bases through the online networks has greatly reduced the need for such data bases. If a search of one commercial data base is not equivalent in coverage of a specific topic to an in-house data base then a search through two or three commercial data bases probably will be. In addition it will be cheaper. An approximate total cost for a single search through commercial data bases is £100. If 100 such searches are performed per annum this equals £10,000. The cost of one information scientist plus overheads is greater than this and an in-house data base of this nature is undoubtedly going to require more than one information scientist to maintain it.

The construction of in-house data bases of published literature should be a very low priority activity. The considerable staff resources required to compile and maintain items from an ever-increasing volume of literature, compared with the facility given by on-line services of access to a wide range of commercial data bases, make it a very unproductive activity.

The main justification for the compilation of a data base of published literature lies in its value in retrospective searching. As discussed above, in many situations customers

do their own searching. The implications of this must be considered if such a data base has to be constructed. The subject areas of interest to the customer must be included—more customer liaison—but also it may be necessary to construct the data base in a form usable by the customer.

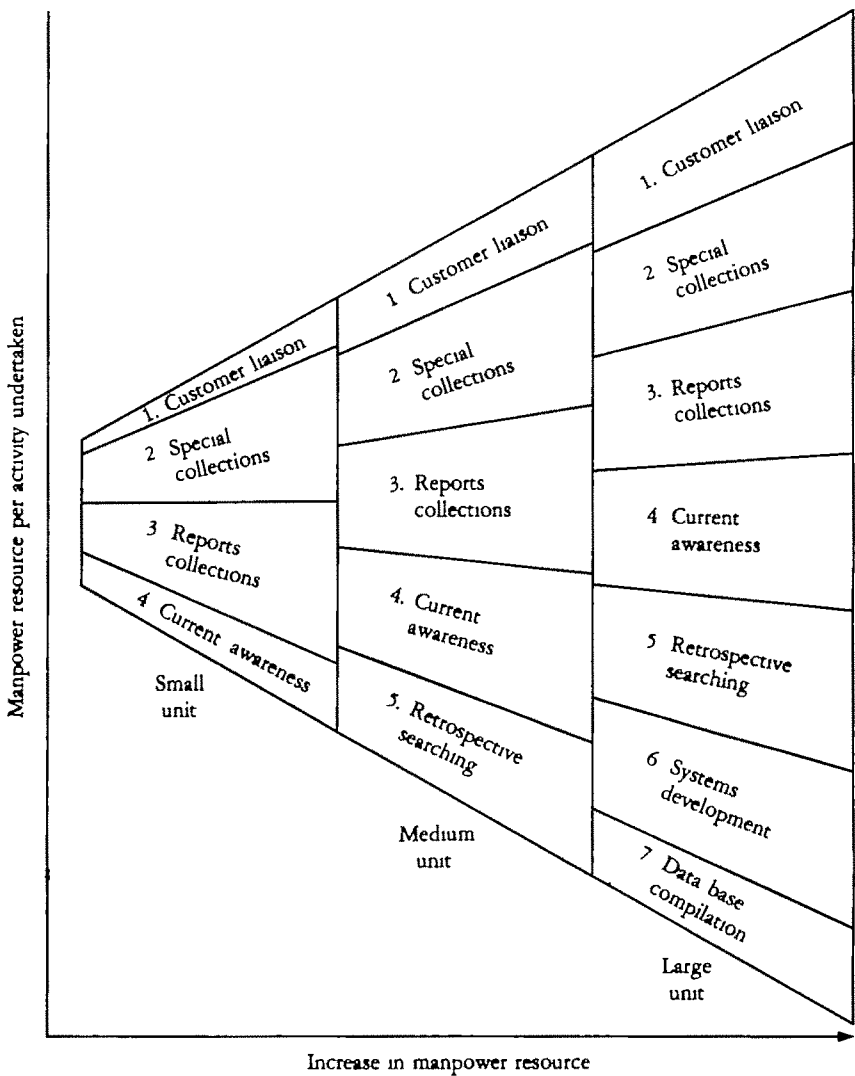


FIG. 2. *Diagram of probabilities*

Conclusion

The paper has discussed the activities which should be performed within an industrial information unit and has given an order of priority for these activities. It has been stated that a small industrial information unit cannot perform all these activities and the size of the unit obviously affects how many of the activities can be undertaken. Fig. 2 indicates the probable situation for a small, medium and large information unit. It can be seen from Fig. 2 that a small information unit will spend the majority of its time on maintaining special collections and reports collections and providing an information service from them, a proportion of its time on customer liaison and a proportion on current awareness. Fig. 2 illustrates how the situation changes with growth of the unit. The amount of time spent by larger units on special collections, reports collections, and customer liaison will be greater than that spent by a small unit but will be a much smaller percentage of the total manpower resource available, hence other activities can be undertaken. Fig. 2 is meant only as an illustration and not as a precise statement of how resources should be allocated.

The paper began by stating that the objective of an industrial information unit was to get the right information to the right person at the right time and at the right cost. Will this objective be achieved in an information unit designed on the scheme proposed? It should. The 'right information' requirement has been met by concentrating on information the customer cannot obtain in other ways. Customer liaison has been emphasised throughout the paper which should ensure that information is provided to 'the right person' at 'the right time'. The 'right cost' has been met because from within limited resources, priorities have been selected and a cost-effective approach has been adopted in meeting them.

Therefore the information services manager can approach his or her own management and request permission to construct an information service on this hypothetical green-field site to the design described. However, there is no guarantee that the design will be approved. Management may have their own ideas on the services the information unit should provide and will insist that they are given priority, *mais c'est la vie*.

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Library and information services of the International Tin Research Institute

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The library of the International Tin Research Institute houses a unique collection of material on all aspects of tin. The wide range of subjects covered, from 18th century tinplate production to modern organotin biocides, and the information explosion of recent years, has necessitated the introduction of a new, hierarchical, indexing system. Lack of storage space in the library has been overcome by the use of a microfilm reader/printer and by storing abstracts obtained from abstract journals rather than obtaining full copies of papers immediately. The other information services of the Development Department include the production of a quarterly journal, an annual report, various technical publications and technical films. A free and confidential advisory service is offered to industry by the Institute.

The International Tin Research Council (ITRC)

THE ITRC WAS set up in 1932 and is financed by the government of the major tin producing countries of the world: Bolivia, Indonesia, Malaysia, Nigeria, Thailand and Zaïre, to investigate and promote new and existing uses of tin.

The International Tin Research Institute (ITRI) in Greenford, Middlesex, which houses the headquarters, library and laboratories of the ITRC, was opened in 1938. There are overseas Tin Information Centres in Australia, Belgium, Brazil, Federal Republic of Germany, Italy, Japan, Netherlands and the USA, whereby the information and services of the Institute are made available worldwide.

The ITRI comprises some 80 staff, of whom about half are of graduate level. The technical staff are employed in either the Research Departments (Chemistry or Metallurgy and Tinplate) or in the Development Department. Research is carried out into many areas of possible and actual tin usage with the aim of increasing the effective use of tin by industry.

The Development Department

The Development Department, of which the library forms a part, ensures that industry is kept informed of progress in tin technology by making use of publications, exhibitions, films, conferences and press liaison. 'Tin and Its Uses' is the quarterly journal of the Institute and is published in English, French, German, Italian, Japanese and Spanish editions with a circulation of over 30,000.

Many research papers by staff, after publication in technical journals or presentation at conferences, are reprinted as ITRI publications. These now number over 570. More

detailed compilations on specific subjects are also produced. Most of the literature is free to those with a legitimate interest in tin. In certain cases, such as larger handbooks, charges are made to cover the ever increasing production costs.

A total of six short technical films has been made by the Institute. These highlight a specific area and cover subjects including tinsplate packaging, soldering of printed circuit boards, pewter, tin-nickel alloy plating and the Institute and its role in the tin using industry.

Technical advisory service

Apart from the information services provided by the Development Department as a whole, a free and confidential technical advisory service is provided by the research staff of the Institute for the tin user. In implementing this service, the technical knowledge of the staff is backed up by the resources of the laboratories and the bureau of technical information on tin accumulated by the library. This advisory service is world-wide, with the Tin Information Centres playing their part in dealing with the needs of industry in their areas.

Most technical enquiries, other than quick telephone enquiries, are documented and stored, together with the answers supplied. These now exceed 38,000, and in themselves provide a wealth of information on tin which can be referred to and thus avoid duplication of effort.

The library

The library is housed in a fairly small, central room in the Institute. The staff consists of the Librarian, a trainee Technical Library Assistant and two part-time and one full-time Clerk/Typists.

The library carries out both archival and current awareness functions. At present the library subscribes to over 200 journals which are circulated around the Institute to interested persons. Some widely read, general science titles are kept on display for a week before circulation to enable the staff to read these journals in the week of publication. Due to space restriction whole series are seldom kept in the library (a few are kept by the relevant Research Departments) and items of interest to either the tin user or tin researcher are cut from the journals, placed in manilla folders, and stored in metal transit cases, with author and subject cards to aid retrieval. At present the library contains some 60,000 pamphlets and abstracts and 1,500 books all of which are fully indexed, around a quarter of a million cards in all.

Tin is used in many diverse fields—metallurgy (e.g. bearing metals, soldering, pewterware) coatings (e.g. tinsplate packaging, tin alloy decorative/protective coatings) and chemistry (organotins for biocides, stabilizers and catalysts for plastics, lubricant additives, inorganic chemicals for plating baths, catalysts, ceramic pigments, conductive films, solar cells).

This wide range of interests, particularly in the chemical field, expanded greatly during the sixties with the advent of organotin biocides for use in wood preservation and antifouling paints. Figure 1 shows how the percentage of papers on organotin

chemistry included in the library has increased since 1950. The superimposed graph shows how the production of organotins has increased between 1955 and 1970. It can be seen that the expansion of organotin production which took place in 1965 was preceded by an increase in information available on the subject held by the library.

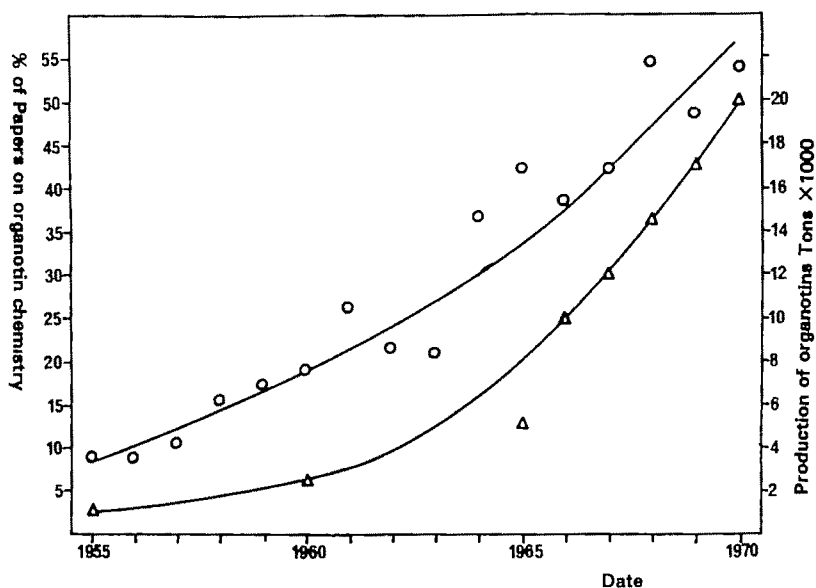


FIG 1. The upper line represented by open circles shows the percentage of papers on organotin chemistry collected each year and refers to the left hand scale; the lower line represented by open triangles shows the annual worldwide production of organotins in tons $\times 1000$ and refers to the right hand scale

The 'information explosion' of the seventies has been felt here, as in most libraries. Figure 2 shows the number of accessions per year from 1949 to 1979. The large discrepancies in the data correspond to library staff disruptions, but even so an average of 500 papers per year, which remained fairly consistent between 1949 and 1970, has increased to an average of 1000 papers per year over the last four years.

This increase in papers, and change in distribution has made the old indexing system, which was set up before the war, very unwieldy. In 1975 a new subject index was devised with a hierarchical structure containing about a dozen major 'family trees' of indexing terms and a few minor ones of a more miscellaneous nature. The major 'family trees' are headed by the following terms.

- Alloys and Metals
- Analysis
- Coatings
- Ecology

Food
Legislation
Organotin Compounds
Plastics
Soldering
Specifications
Tin Chemicals Inorganic
Toxicity

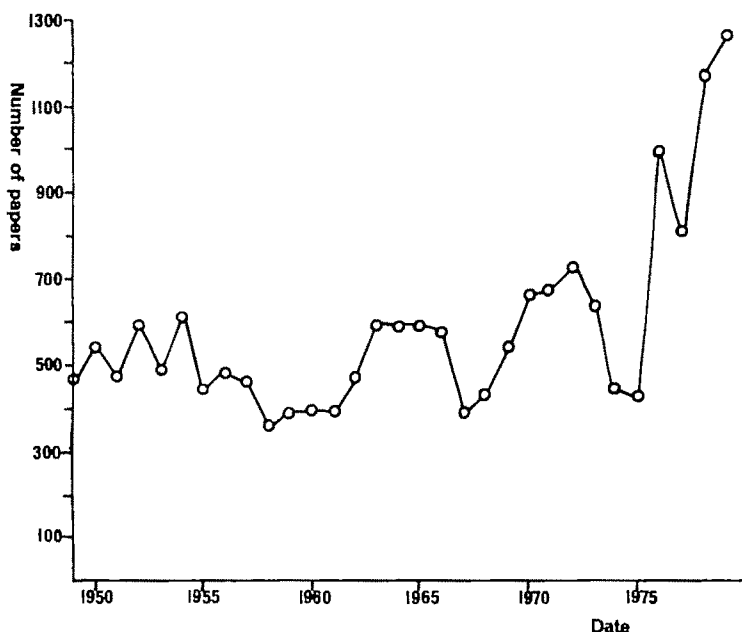
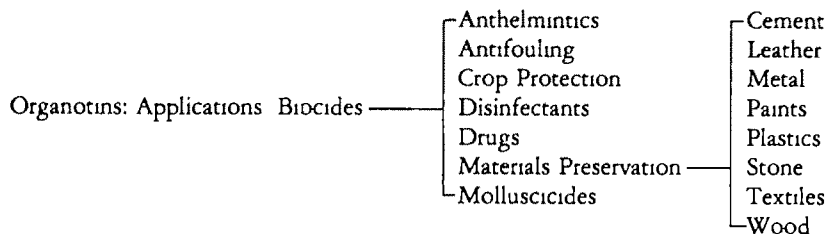


FIG 2. *Total number of papers collected by the library each year.*

This system was chosen to provide ease of scanning, the minimum number of cards, and the facility to add new terms as necessary without risk of overlap with existing terms. In general the classification is biased towards applications, as both the research done here at the Institute and the enquiries received are of an applied nature. Back indexing is also taking place, but this will obviously be a long term project, and so for the foreseeable future, the library will have two indexing systems running side by side.

A small portion of the index dealing with the biocidal applications of organotin compounds is shown below, along with a few examples of titles indexed under this

system. Of course indexing is done from the paper's content and not just the title, but I have attempted to use self-explanatory titles for these examples.



Examples

Organotin Compounds and Applications P. J. Smith and L. Smith.

(Chemistry in Britain, 1975, 11, (6), 208-212 & 226)

Pesticides and Preservatives in the Environment. N. N. Melnikov.

(Zh.Vses.Khim.Obschest, 1973 18, (5), 570-576).

The Use of Organotin Compounds for the Preservation of Materials H. Plum

(Chimie des Peintures, 1972, 35, (4), 127-138)

Tributyltin Wood Preservatives A. J. Crowe, R. Hill and P. J. Smith.

(Proceedings of the 5th International Symposium on Controlled Release of Bioactive Materials, Maryland, USA 14-16th August, 1978).

Indexed Under

Organotins Applications

Organotins Applications
Biocides

Organotins: Applications,
Biocides; Materials
Preservation.

Organotins. Applications
Biocides; Materials
Preservation Wood

Thus while all the most pertinent papers on wood preservation will be indexed under 'Organotins: Applications Biocides: Material Preservation: Wood' the user must also look under the more general headings to ensure retrieval of all the papers on this subject.

An internal current awareness bulletin is produced every two months for distribution in the Institute and to the overseas Tin Information Centres. This contains abstracts of all library accessions (approximately 200 per issue). Items of news concerning tin from the more popular journals and not of sufficient length or lasting significance to be included in the library as pamphlets are also included in the bulletin. Staff news and details of visits and meetings attended by personnel from both the Institute and the Tin Information Centres is also listed.

Abstracts of all papers on chemistry topics are regularly sent out to a select list of

some 270 outside organisations who have an interest in organotin compounds. This has developed due to the great interest which has recently been shown in the use of organotin compounds as biocides for wood preservation, antifouling paints and many other applications

The library subscription to *Chemical Abstracts* was cancelled at the beginning of 1979. It had been found that the size and general nature of *Chemical Abstracts* meant that research staff found it of limited use because of the time involved in doing searches. It was decided that it would be more cost effective to increase the number of subscriptions to relevant technical journals and on subscribing to the UKCIS Current Awareness Service. The UKCIS service involves, in our case, a search on the following keywords:—whitemetal, cassiterite; cans; ternplate; solder; bronze; pewter; and any words commencing with the letters tin- or stann-. Articles from journals which the library subscribes to and in languages other than major European languages are excluded, however Patents in all languages are included in the printout. This service has proved to be very useful, both to the library and research staff and will be continued on a regular basis. Our location near London means that any more detailed literature searches which are required can be made with the aid of the capital's many reference libraries.

The library has recently undertaken the task of compiling bibliographies on selected topics. These so far include bearings, bronzes and analysis of plating solutions and plated coatings. Each bibliography has involved a search of all papers held in the library on the subject concerned going back at least 30 years. Each paper is abstracted and the papers are listed under headings. For example in the bibliography on bearings the papers are divided under headings depending on the composition and, within this category, depending on whether the paper is concerned with applications, corrosion, lubrication, manufacture, properties or wear.

The main problem with our library, as with many others, is lack of space. In our case this is partly overcome by not keeping long runs of journals and by the fact that about one quarter of the library stock is out on permanent loan to either individuals or departments within the Institute. The major space saving contribution came from the acquisition of a microfilm reader/printer. The older documents are now stored on 16 mm microfilm roll. One film roll will hold documents which previously occupied three feet of shelf space, and, as well as saving space, the older, difficult to replace documents are in less danger of being lost or damaged.

As with many specialised libraries, the Institute's library is having to adopt new methods to cope with the information explosion. Microfilm is one method, although not very popular with the user. Another method which is being used to a certain extent is the retention of abstracts and references, obtained from the 7 abstract journals and the UKCIS Current Awareness Service, rather than full documents. This means that greater reliance is placed on the large national libraries, to whom we must go if the full paper is called for at any time.

The International Tin Research Institute subscribes to various organisations and schemes (CICRIS, Inter-Lab, Aslib, Inter-Library loans, LASER) to widen its scope. Anyone with an interest in tin can consult us or, by prior arrangement come to use the library. Using all the techniques mentioned above, the International Tin Research Institute provides an essential information service to the tin-using industry.

The British drug information service

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This paper describes the type of drug information service available in the UK, its scope, limitations and possible future development. A survey was carried out in which information pharmacists in the sixteen major drug information centres in the UK were interviewed.

All centres have access to a large number of information resources and, in addition, have developed a resource which reduces the delay before published information is retrievable from their own system.

Some centres receive large numbers of enquiries and have little time for active dissemination of information whilst other centres with few enquiries actively disseminate information to hospital staff. Some centres send bulletins to general practitioners, retail pharmacists and community nurses.

Most information pharmacists refer enquiries concerning drug therapy in patients with which they may have difficulties to clinical pharmacologists or other medically qualified personnel.

General practitioners use drug information services less often than hospital doctors. Most information pharmacists plan to extend their services to medical and paramedical staff in the community.

In the future, information pharmacists plan to use improved technology to provide a more efficient service, open for longer hours, provide clinical opinion with the help of clinical pharmacologists and increase the functions of drug information centres (e.g. adverse drug reaction monitoring).

Introduction

IN 1970, the Working Party on the Hospital Pharmaceutical Service stated that there was a need for pharmacists to advise doctors on those aspects of drug therapy for which they have been trained.¹ This need has arisen from the ever increasing volume of information about drugs that is available in professional journals and from commercial sources. Drug information pharmacists have assumed this advisory role and have formalised the information services that they offer by establishing drug information centres.

Services in the UK were first introduced in 1970 at the London Hospital and Leeds General Infirmary. The latter centre became the first regional centre in 1973. In 1979, regional centres existed in 11 regions of England and in addition there were three major centres in Scotland, one in Wales and one in Northern Ireland. (Recently an additional centre has been established in Scotland.) Representatives from all English regions, Scotland, Wales and Northern Ireland meet on a regular basis to promote

national co-operation in the provision of drug information, and to avoid duplication of effort in each of the individual centres.

The value of drug information centres as a source of information has been a matter of some discussion. One representative of the pharmaceutical industry expressed some confusion about the role of the drug information service and stressed the value of contacting the relevant pharmaceutical firm directly for information.² A clinical pharmacologist commented that pharmacists received little training in physiology, pathology and clinical medicine and hence could not undertake most of the functions of a clinical pharmacologist, as had been claimed.³ However, despite these differing views, all of the major drug information centres have received letters from local consultants praising the service that they provide.⁴

The Study

In order to document the type of drug information service available in the UK, its scope, limitations and possible future development, we decided to interview the principal pharmacists in each major centre in the UK. The interview schedule consisted of 26 questions. The results of our survey supplement previous analyses of the types and sources of enquiries received by some centres;^{5,6,7} and the broad description of the functions of drug information centres.^{8,9}

Results

1 *Information Resources*

The information resources to which the centres visited have access are shown in Table 1. In addition, all centres subscribe to a small number of journals. In order to increase the resources of each centre, the National Abstracts scheme was developed. Each of 13 centres abstracts articles appearing in between two and 11 journals, duplicates the abstracts and via a co-ordinating centre distributes them to all 16 centres. The journals for which each of the 13 centres are responsible are previously agreed, and currently total 80. The abstracts are indexed by each of the producing centres and when filed are retrievable. The main advantage of the scheme over commercially produced resources is its very short delay period from the time that the article is published and the incorporation of the retrievable abstract in each centre's information system.

Another innovative information system that has been developed by the information pharmacists is the 'specialist file' resource. Ten of the centres visited have collected in depth information concerning specific drug topics. This information is freely available to all the other centres.

On average, each centre contacts the Pharmaceutical Society five times per month for drug information, and the pharmaceutical industry considerably more frequently, about four times per week. We found that 75 per cent of the centres had easy access to clinical pharmacologists who can advise on clinical matters arising out of drug information enquiries.

Table 1 *Information Resources Available to Drug Information Services in the UK.*

RESOURCE	% of Centres Having Access to Resource
<i>On line Resources</i>	81
— BLAISE	81
— RINGDOC	13
— DIALOG	13
— Excerpta Medica	6
<i>Off line Resources</i>	100
<i>Providing Abstracts</i>	100
— National Abstracts Scheme	100
— Clin Alert	81
— Guild of Hospital Pharmacists Abstracts	81
— IOWA	81
— In pharma	75
— Excerpta Medica	63
— International Pharmaceutical Abstracts	63
— FDA Abstracts	50
— Chemical Abstracts	44
— de Haen system	25
— BIOSIS	19
— Others	19
<i>Providing References</i>	100
— Index Medicus	94
— Current Contents	69
— Index of New Products	63
— Science Citation Index	44
— Unlisted Drugs	38
<i>Libraries</i>	100
— Hospital	75
— Medical School	69
— School of Pharmacy	25
— University (Science)	38
— Others	6

2 *Use of information resources*

The information resources that are used to answer certain common enquiries are shown in Table 2.

The majority of centres refer to the pharmaceutical industry for pharmaceutical information (bioavailability, pharmacokinetics, formulation etc.), and approximately half of the centres obtain new product information from this source. Only 25 per cent of the respondents mentioned referring to the industry for information about adverse

Table 1 *Sources of Information Used to Answer Common Enquiries*

Type of Enquiry	Sources Used Most Frequently by Drug Information Centres		
	1*	2	3
Adverse Drug Reactions	Data bases – Abstracts Textbooks	Data bases – Index	Martindale Extra Pharmacopoeia
Drug Interactions	Textbooks	Data bases – Abstracts	Own files
Product Efficacy	Data bases – Abstracts	Data bases – Index Published literature	Martindale Extra Pharmacopoeia Manufacturers' Information
Problems involving Chemicals other than Drugs	Merck Index	Textbooks	Manufacturers' Information
Pharmacokinetics	Data bases – Index	Textbooks	Data bases – abstracts
Poisoning	National Poisons Centre	Textbooks	Manufacturer's Information
Tablet Identification	Chemist and Druggist Directory	Pharmacy Colleagues	Imprex

* 1 refers to the source(s) most frequently used

drug reactions and drug interactions. Although manufacturers' published literature was used by all centres to answer enquiries, there was some degree of caution expressed about the use of this type of information. Thirty-one percent of the principal pharmacists checked all the references quoted in this form of information.

All centres were aware of the value of unpublished data (e.g. personal experience arising out of pharmaceutical duties, clinical experience of doctors etc.). Such information was provided by all centres, if relevant to an enquiry, but attention was drawn to the fact that the information was unpublished.

3 *The number and nature of enquiries received during 1978*

The number of enquiries received by each of the centres visited is shown in Table 3. About 75% of the queries are received by telephone, 20 per cent result from personal contact and the remaining 5 per cent arrive in the post. Table 4 shows the source and nature of enquiries received. The results have been averaged for all the centres contributing to the study, but the range and standard deviation have been included.

Table 3 *Number of Enquiries Received by Major Drug Information Centres in the UK in 1978*

Number of Enquiries	Number of Centres
Less than 500	1
500-999	4
1000-1499	3
1500-1999	4
2000-2499	3
2500-2999	1

Table 4 *Source and Type of Enquiry Received by Drug Information Services in the UK in 1978*

Source of enquiry	% of Enquiries	Range %	± SD †
<i>Doctor</i>	44	21-71	14.2
— Consultant/Academic	(13)	7-27	5.1
— Senior Registrar/Registrar	(14)	2-25	7.9
— Senior House Officer/House Officer	(14)	2-28	8.7
— General Practitioner	(3)	1-6	1.9
<i>Pharmacist</i>	40	10-73	16.4
— Hospital	(35)	17-68	13.5
— Retail	(3)	1-15	3.7
— Other	(2)	1-10	2.9
<i>Nurse</i>	8	2-14	3.5
<i>Other</i>	8	4-17	4.3
— Dentists/Paramedical staff	(3)	1-6	1.6
— Miscellaneous	(5)		
<i>Type of enquiry</i>			
Administration/Dosage	14	2-26	6.7
Availability/Supply	11	5-15	3.1
Adverse Reactions/Side Effects	17	6-28	6.3
Identification	6	3-10	2.3
Indications/Contraindications/Clinical Use	21	4-37	10.2
Interactions (therapeutic)	5	2-11	2.2
Poisoning/Toxicity*	2*	1-4*	0.9*
Pharmaceutical Information	10	3-19	4.4
Pharmacology	6	2-13	3.5
Other—miscellaneous	8	2-15	4.5

* Two centres specialised in answering poisoning enquiries and therefore to avoid distorting the data, data from these two centres have been omitted

† Standard deviation

4 Scope of the drug information service in the UK

All centres are open at least between 09:00 and 17:00, Mondays to Fridays, and all have facilities to cope with urgent enquiries received outside these hours (Usually resident pharmacy staff answer such enquiries, or an 'on-call' system operates.)

Information is usually provided on the same day that the enquiry is received, normally by telephone to enable a fast service to be provided. Written replies (on average about 25 per cent of the total) are usually provided to communicate difficult and complicated answers.

All but one centre actively disseminate information, and this remaining centre plans to do so in the very near future. Such information usually takes the form of a regular bulletin which informs its readers of relevant current articles appearing in medical journals. The recipients of the bulletins are usually hospital staff (often pharmacists), although some regions have extended their production of information to general practitioners, retail pharmacists and community nurses.

5 Present trends and the future of the drug information service

Half of the centres visited had studied the type of service that their users and potential users required. The most common method of study was by issuing users with questionnaires. Sixty-nine per cent of the respondents felt that there were specific factors that determined whether or not a doctor or pharmacist used the centre. These factors included being unaware of the existence of the centre, age of the enquirer (the older medical staff used the centre much less than junior staff), and disinterest in information about drugs.

Seventy-five per cent of the respondents said that they sometimes experienced difficulties in answering questions that involved drug therapy in individual patients. Those respondents that did not have difficulties stated that they referred the majority of such questions to clinical pharmacologists. Other sources of medical opinion included microbiologists and haematologists etc. The most common sort of difficulty arose from the lack of knowledge about drug use in the clinical situation and the disease process. To overcome these difficulties, the majority of respondents suggested that pharmacists should be educated in clinical pharmacy.

Surprisingly, 88 per cent of the respondents had occasionally experienced difficulties in obtaining information from the pharmaceutical industry. Problems encountered included the reluctance of information officers to provide information (e.g. information about ingredients of tablets), slowness of the service provided and difficulties in obtaining any information if the information officer was absent due to illness etc. Some respondents suggested that a minority of drug firms should adopt a more responsible attitude to the provision of information.

The majority of respondents felt that a lack of financial support (and associated problems e.g. lack of adequate staffing levels) was a major factor affecting the efficient provision of information by the service.

Expected future developments mentioned by the respondents included using the recently improved computer technology to provide a more efficient service, opening for longer hours, being able to provide clinical opinion with the help of clinical pharmacologists, extending the service to general practitioners, and increasing the

functions of the centre (e.g. adverse reaction monitoring). Currently, most centres aim to improve the service along these lines.

DISCUSSION

There is a wide variation in the management of each drug information centre and the relationship between each major centre and minor centres in the area or region that it can support. The absence of an overall management policy has allowed flexibility in tailoring the service to local needs. This flexibility may conflict with the policy of national co-operation in the development of specialist skills. Some centres have high query loads and hence will have little time for information gathering activities, whilst other centres can easily develop skills because their query load is low.

It was apparent that all respondents use whatever information resource is necessary if an enquiry warrants an extensive search. However, it is important to know whether or not the answers provided meet the requirements of the users. Currently a survey is in progress to assess users' opinions of the information provided by the Leicester area drug information service. It might be valuable for some of the centres visited to conduct a similar investigation.

The percentage of enquiries originating from doctors, pharmacists and nurses, and the relative proportion of enquiries in each information category has not altered since 1976^{3,6,7}. This suggests that although the number of enquiries received is increasing, either the range of enquiries received are representative of all questions posed about drugs, or the users have a definite concept about the type of drug information available from the service. If the latter applies, it might be valuable to consider whether this concept is accurate.

General practitioners were found to use centre considerably less often than their hospital colleagues. This may partly be due to the limited advertising of drug information services to the community.

Although the drug information pharmacists will readily contact the pharmaceutical industry for information, it appears that a small proportion of the industry does not always provide the type of information service that is expected. In addition, it seems that the information provided is sometimes treated with reservation. It appears that discussions between the two types of information provider could resolve some of these difficulties.

Since drug information services act as intermediaries between information and the prescribing doctor, the usefulness of the service may be assessed by the results of the intermediary action. Very little is known about this, although such data may be necessary to justify any increase in funding by the NHS. Such additional finance may be required in order to improve the service on the lines discussed above.

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APPENDIX

Drug Information Centres on which the study of the British Drug Information Service was based:

England

East Anglian Drug Information Service (Ipswich)
Mersey Regional Drug Information Service (Liverpool)
Northern Regional Drug Information Service (Newcastle upon Tyne)
North Western Regional Drug Information Service (Manchester)
South Western Regional Drug Information Service (Bristol)
Trent Regional Drug Information Service (Leicester)
Wessex Regional Drug Information Service (Southampton)
West Midlands Regional Drug Information Service (Sutton Coldfield)
Yorkshire Regional Drug Information Service (Leeds)
South East Thames Regional Drug Information Service (based at Guy's Hospital)
North East Thames Regional Drug Information Service (based at the London Hospital)

Wales

Welsh Drug Information Service (Cardiff)

Scotland

Glasgow Drug Information Service
Lothian Drug Information Service (Edinburgh)
Tayside Drug Information Service (Dundee)

Northern Ireland

Northern Ireland Drug Information Service (Belfast)

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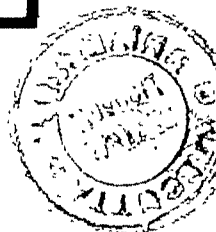
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Consumer information and advice: the role of public libraries

Jennifer Rowley
David Butcher
Christopher Turner

City of Birmingham Polytechnic

An examination of the work of Consumer Advice Centres and of the information sources and support activities that public libraries can offer. CAC's have dealt with pre-shopping advice, education on consumers' rights and complaints about goods and services, advising the client and often obtaining expert assessments. They have drawn on a wide range of information sources including case records, trade literature, contact files and external links. The recent closure of many CAC's has seriously affected the availability of consumer information and advice. Public libraries can make many kinds of information sources more widely available, both to the public and to the agencies now supplying consumer information and advice. Libraries can co-operate closely with advice agencies through local co-ordinating committees, shared premises, joint publicity, referral and the sharing of professional expertise.

Introduction

THE PROVISION OF consumer advice is undergoing a transformation. During the early 1970s Consumer Advice Centres were established as the primary specialist agencies dealing with consumer advice. Such Centres were established by many local authorities. Between 1973 and 1978 it was the policy of government to encourage local authorities to set up such Centres and by mid-1979 there were about two hundred centres. Most Centres were run by Trading Standards Departments and financed partly by government and partly by the local authority. Others were controlled by Environmental Health Departments, Citizens Advice Bureaux and the Consumers Association. The funding available to CACs has been drastically cut in the latest round of government expenditure cuts, and many CACs closed during the latter months of 1979 and the early part of 1980.

It is envisaged that the Citizens Advice Bureaux will replace the CACs as agencies giving consumer advice in many areas. The government has made funds available to NACAB (National Association of Citizens Advice Bureaux) in order to help CAB fulfill a consumer advice role. Other agencies may also find it necessary to direct a more concerted effort towards consumer affairs. The effect of removing the specialist agencies and tackling consumer problems within a generalist agency such as CAB is yet to be experienced. What role can public libraries play in consumer information and advice? The authors have recently completed a consultancy project for the West Midlands Project Co-ordinating Committee of NACAB. In the course of the project



the team visited 20 CACs throughout the country. CACs in a variety of geographical locations, organizational settings, work loads and staffing arrangements were visited. In addition the team visited many CAB and certain other agencies with a role in the consumer advice or information field.

In order to examine the libraries' role in consumer advice, this article commences by examining the activities of Consumer Advice Centres, and then discusses the extent to which libraries can support consumer advice activities in CAB, CACs or other agencies.

Consumer Advice Centres: their work

Consumer Advice Centres were established to make advice and support on consumer issues available to the general public. The Centres have evolved their own definition of consumer advice work. A common definition is that consumer work relates to any situation involving a transaction between a trader or retailer and a customer. In its broadest sense then, consumer work embraces housing, insurance, credit and retail trade transactions. If other agencies are available in any area to deal with some of these topics—such as Housing Aid Centres, Legal Aid Centres, CAB—the term may be defined more narrowly. Here, consumer problems are those that arise from a purchase, and relate primarily to commodities such as clothing, furniture, shoes, cars, electrical goods, etc.

The original philosophy of CACs is evident in their alternative name: Shoppers Shops. CACs were established as shops in good shop-front premises located in central high streets or shopping precincts. It was anticipated that CACs would devote much of their efforts to pre-shopping advice. A central feature of pre-shopping advice is the pre-shopping interview during which the adviser helps the shopper to identify the characteristics that she requires of a product. These interviews however represent only a small part of the work of most CACs.

Educational activities are an important component of the work of CACs since they equip the consumer with an ability to handle the more straightforward of his own consumer problems. Centres present lectures and supervise seminars on consumer rights to voluntary, church, women's, handicapped persons groups, for example. Others are engaged in significant programmes on consumer education in schools and colleges. Some CACs also organise seminars and lectures for local traders dealing with the trader and consumer rights and responsibilities. CAC staff may be invited to staff training sessions in, for example, a big store. All such activities are important in promoting relationships with the local community, and establishing the Centre's image as an expert in consumer affairs.

Many CACs mount displays, usually in relation to a specific product or commodity such as washing machines, cookers, bicycles; such displays usually incorporate take-away literature. Centres also use displays to advertise their existence and activities. They may use posters in central positions such as underpasses, inserts in local newspapers, stands at local shows, and leaflets in public libraries. Some CACs prepare price surveys of the prices in shops in their locality.

The bulk of the workload of CACs stems from complaints and enquiries. Such enquiries may span the entire range of consumer problems, but primary problem areas are secondhand cars, furniture, shoes, mail order goods, credit refusal and delivery

delays. Each case commences with a detailed interview with the complainant or enquirer in order to identify the client's problem. Information may be given, or alternatively the client may require advice on his rights and court procedures. The client may simply be informed as to his position and what action to take, or, if the client is unable to cope alone, the adviser will conduct a case on behalf of the client. Advisers will communicate with traders, take the case to the County Court, and perform any other procedures or activities necessary to a satisfactory conclusion of the case (e.g. telephone calls, write letters, complete forms, negotiation). CAC advisers must be able to evaluate the strength of a case, and thus need product knowledge and experience of the necessary procedures. Many advisers are held in high regard by traders and may be used as independent arbitrators between customers and traders.

The work of the CAC is accomplished, typically, by a staff of three or four full-time paid advisers plus clerical, secretarial and receptionist support. Advisers are trained initially on the Consumers Association basic training course and then by seminars and lectures on new aspects of practice or law. The Diploma in Consumer Advice is important in training. Home Economics and legal backgrounds are often found, but the ability to interact satisfactorily with the public is regarded as most vital.

Consumer Advice Centres: information sources

Considering the nature of the work of the CACs, it is plain that information is necessary to support many of their activities. Some of the information provision must of its nature be catered for by the advice agency itself, but other information sources could be more readily supplied by outside agencies such as public libraries and various organisations specialising in consumer information. It is helpful to know what sources the Centres can be expected to hold on-site in order that any other support agency may complement in-house provision.

Firstly, the work of an advice centre generates some information. All Centres keep case records. Current CAC practice is to enter each case on an Office of Fair Trading form—which includes details of the client, the trader, the complaint and the action taken. One copy of these forms is submitted to the local Trading Standards Office where statistics are compiled and dubious traders can be identified. Other copies are kept in Centres for subsequent retrieval. In addition to case records all Centres compile some types of files and indexes of documents and information that they encounter in the course of their work. Typically, Centres will have a consumer information file, a retailer/trader index, and a contacts file or index. The consumer information file contains copies of legislation, codes of practice, leaflets, copies of periodical articles, standards, etc. from government and local government departments, trade associations, manufacturers and public utilities. In CAB-run CACs the consumer information file may be integrated with material received from central NACAB information services.

CACs also have a small reference collection of periodicals and bulletins, books and directories, and pamphlets. An important component of this collection are the services provided by the Consumers Association Advice Centre Servicing Unit. These fall into two groups: a general information service and a market information service. The general information service package includes: *Directory of Consumer Information Sources*, *ACSU News Bulletin*, *Which?* magazines, *Daily Consumer News*, *Information Sheets*, and

access to CA advice via Hotline. The Market Information Service combines Hotline, the *Directory of Market Information*, and the *Directory of Manufacturers*. In addition documents are acquired from a variety of other sources, although not always in a systematic way. Bulletins (such as *Clapham Omnibus*, *LAG Bulletin*,) are acquired and used for updating. Periodicals are used by both staff and enquirers to cover new product knowledge e.g. *Good Housekeeping*, or new legal practices e.g. *New Law Journal*. Each Centre normally has a small collection of books including many issued by CA, and some legal textbooks. A few directories covering some trades and types of organisations are usually available and are used as a source of telephone numbers and addresses. Pamphlets from a variety of agencies, including the Office of Fair Trading, Gas Boards, and manufacturers, are acquired and kept on-file and made available to clients to take away.

Plainly, documented information is not enough. CACs have established links with both local and national organisations. Local contacts are essential for publicity, credibility and expert advice. Expert advice may be obtained from Chambers of Commerce, testing-houses, surveyors, engineers, garage managers and local traders. Most CACs cooperate with other local community advice and information centres, and some referral between centres is usual. National bodies are only contacted occasionally, but a wide variety of sources might be used including trade associations, research associations and company search agencies.

Many of these contacts and information sources and records will be destroyed or lost in the transition between CAC and consumer advice provision by a more general agency. Hence it will be more vital than ever that libraries attempt to give as much support as possible with information back-up.

Public libraries and the provision of consumer information

With the closure of many of the CACs, public libraries will need to reassess their existing provision of consumer information sources and their cooperation with, and support for, the remaining consumer information and advice sources in the community. In many cases libraries are already involved in the consumer field through their general reference and information services but, as in the case of business information or services to schools, the special needs of individual users and of information and advice agencies must be considered if the contribution of libraries is to be effective. The remainder of this article outlines the kind of information provision that libraries should consider in order to meet the wide range of consumer enquiries, and the forms of cooperation between libraries and other agencies, ranging from the sharing of premises and resources to referral and publicity.

Periodicals and books

Many public libraries provide a range of consumer information sources, but have not exploited them to the full. Much of the information is concerned with the assessment of products and is important if consumers are to make informed buying decisions. The Consumers Association magazines—*Which?*, *Motoring Which?*, *Money Which?*, *Handyman Which?* and *Holiday Which?*—are all valuable for their advice on what to look for when buying particular products and their direct comparisons of what is

available. Many libraries also take periodicals like *Good Housekeeping*, *Motor* and *Hi-Fi News*, which have details of new products and reports of performance tests on individual pieces of equipment, but access to these reports scattered in various issues is a problem. The *Which?* cumulative index is fairly satisfactory and some other test reports are collected in separately published volumes, but in other cases the periodical's own index (where one exists) or collective indexes like *British Technology Index* and the *Clover Information Index* have to be used. More libraries could consider compiling their own indexes to test reports in selected periodicals, or extracting or copying the reports to create special files which provide easier access for the user. Publicity is important in libraries having these files and indexes, or many users will remain in ignorance of their existence.

Books and pamphlets from a variety of sources can complement the product information provided in periodicals by treating common problems and activities in greater depth. The Consumers Association publishes a range of cheap and fairly regularly revised books such as *Which? way to buy, sell and move house*, *The Buyer's Right*, *Central Heating* and *Cutting your cost of living*. The Office of Fair Trading's useful series of pamphlets *For your protection* briefly summarize consumers' rights and what to look for when buying goods and services such as shoes and package holidays. These can be made available as single copies or in multiple copies for distribution to the public. Research Associations and Trade Associations may publish sources which deal with the problems of particular products, such as the well-illustrated pamphlets on shoes from SATRA. Commercial publishers issue useful titles from time to time, like the BBC's *The way the money goes* or *The A to Z of shopping by post* from Exley Publications.

Legal sources may cause problems for libraries, particularly of up-dating and cost. Individual pieces of legislation will be in The Public General Acts and Measures or can be obtained separately, but attention must also be paid to statutory instruments. Among the basic legal textbooks, those on contract law as well as more specifically consumer legislation are needed. Popular treatments of shoppers' rights may also be provided, but great care must be taken to see that they are up-to-date. In most other cases it is preferable to refer users with legal problems to other agencies.

Company information

Consumer problems often require information on a particular company, or on who makes a certain product, or on the identity of manufacturers using trademarks and brand names. Some of these can be answered using the general and specialised trade directories found in most libraries of any size. Where information is required in more detail or on less reputable firms and recently registered companies, only the larger public business information libraries are likely to be able to help. As well as helping the individual enquirer, many libraries can provide other information and advice agencies with access to up-to-date company information sources. In some cases they may also consider offering small collections of essential reference sources on permanent loan to information and advice agencies.

Local information

A fair number of public libraries already routinely collect and file much local information which would be of value to other organisations. This includes lists of

local societies and organisations, directories of local information and advice sources, information about local firms and their products, and local government directory-type information. Events bulletins with details of local cultural and recreational activities are also of value. This information may be collected solely by the library or in cooperation with other local sources—as with the several volumes of the *County Information Handbook* issued by Suffolk County Library. The collection and up-dating of local information is difficult and time-consuming, and some cooperation between local agencies would avoid duplication and ensure wider availability of organised information. In recent years a number of public libraries have developed information services to local government officers and councillors, including regular current awareness bulletins drawing attention to recent books and articles of interest. One or two have extended this kind of service to local advice agencies and voluntary groups. For example, Lambeth Libraries have published the monthly *Lambeth Umbrella Group Information sheet* since late 1976 with the cooperation of the local CAB. This gives details of changes in legislation and government policy and local information for Lambeth, with consumer topics well represented.

The Post Office's Prestel service has been tested by six library authorities during its market trials, and they have gained valuable experience both as users and as information providers. A considerable amount of consumer information has been input by the Consumers Association and other consumer-related bodies; this can be made available to individuals and other agencies through those libraries which subscribe to Prestel. In addition, libraries may collect and input local information, some of it consumer-oriented, in cooperation with other local government departments, local advice services, etc.

While few libraries have the detailed product information, including manufacturers' literature and material from trade associations and other bodies provided by most CACs, they do normally have more consumer information sources than the other agencies involved in this work. Such information is a fundamental need for most people at some time. Each one of us is a consumer and faces the problems of choice, of how to select, of faulty goods and so on. At present the public library's services tend to be quite well-used by the more book-oriented members of society, but many other people seem to prefer oral and pre-digested information on consumer topics. It is possible that greater awareness of library provision would not significantly increase the direct use made of the resources by individual members of the public. It is important to look at how the library can cooperate with other agencies which may reach a wider public and which can use its resources on behalf of their clients.

Cooperation with other agencies

Some aspects of cooperation have been dealt with already, but there is considerable scope for further cooperation. In some areas of the country the library service and local information and advice agencies are cooperating in order to coordinate the local provision of service. This valuable link helps to make advice workers more aware of what other agencies are doing, aids accurate referral work, and reveals any local gaps in provision. Such cooperation is in action in both urban and rural areas, usually through formal committees whose members represent the various advice agencies. The South Molton Rural Community Information Project in Devon is one such

example, involving cooperation between the Devon Community Council, Citizens Advice Bureau and the County Library. Libraries are well placed to participate in cooperative ventures in rural areas with their well-established network of full- and part-time service points supplemented by mobile libraries. These could form the basis for a coordinated network of information and advice provision in the consumer field as well as more generally.

Cooperation between the library and other agencies may be enhanced when they are sited in close proximity or share premises. Although Citizens Advice Bureaux often seek to avoid direct identification with local government services, a number of sharing arrangements exist, as in Cambridgeshire and Suffolk, which allow easier access to the library's resources for consumer information. Such sharing has its problems and requires an adjustment of attitudes by both parties; however, it does facilitate sharing of resources and reduces the drop-out rate for referrals from one agency to another.

Most libraries will try to refer enquiries to a more appropriate information source when they are unable to deal with the enquiry fully. Such referral is particularly important in larger urban areas with a considerable number and confusing range of information and advice sources available. To be able to act effectively as a referral centre, the library must have sufficient information about each source, its scope and capabilities. Information on local sources for referral must usually be collected by the individual library; national sources in the consumer field can be exploited if the Consumers Association *Directory of Consumer Information Sources* is held.

Public libraries could offer a number of other kinds of support to consumer information and advice agencies. Some of these organisations would benefit from professional advice on the organisation of their collections of data and publications, particularly on systematic subject indexing. Professional librarians can also assist in the training of advice workers, both in the development of their information-handling skills and in creating awareness of the resources that libraries and other external information sources can offer. Libraries can help to publicise the existence of the information and advice agencies and make members of the public aware of the kinds of service offered through joint publicity. Some libraries are already involved in such cooperation. The Peterborough Information Group in Cambridgeshire participates in joint publicity with other local information and advice services. Displays of, for instance, consumer products and publications in the library can also be valuable in helping to increase public awareness of consumers' rights and of sources of further information and advice. These can be prepared in cooperation with the local Trading Standards Department and Citizens Advice Bureau, and perhaps local traders.

Public libraries have a valuable contribution to make to consumer information service both in the direct provision of appropriate information sources and through liaison with and support for the information and advice agencies involved in this field. While some extra resources will be needed in many areas, much can be done by an investment of staff time to promote the necessary cooperation. This involvement is likely to be cost-effective in increasing the exploitation of existing library resources and in avoiding duplication of local services and resources.

Libraries and consumer advice: options and issues

So far the more traditional library functions of information provision, support and

referral have been examined. A topical question is the extent to which libraries should become directly involved in advice work in the consumer field and in other areas. Taking into consideration consumer advice work as it has been performed by CACs, there may be scope for libraries to engage in advice provision in this area. There are several possible options:

- to provide an active advice service in cooperation with other agencies
- to integrate consumer advice into a library-operated general community information and advice programme
- to offer a specialist advice service for consumer problems only
- to reorientate the basic functions of library services to give information and advice as appropriate in the normal course of work

Depending on the nature of the library's service and the option selected in relation to the structure of the service, public libraries must consider whether it is possible and/or desirable to participate in negotiations or advocacy as well as in advice work. Both have been a part of CAC work. advocacy involves the preparation of a case for the enquirer and giving support at the court hearing, while negotiations involve active intercession between the client and the trader. Other advice agencies in consumer work have not always actively participated in either advocacy or negotiations.

Most of the suggestions for library involvement made in previous sections have required minimal additional resources, but more active participation in advice work would necessarily entail a significant associated resource commitment. This will obviously pose considerable problems for public libraries in the present economic climate. Any of the above options will necessitate a fairly heavy staff involvement, which at the very least implies thorough staff training programmes in the advice area, and could extend to the appointment of specialist staff. Libraries might also be obliged to consider the integration of volunteer staff into the advice service. This article has reviewed a number of alternative levels of commitment to consumer information and advice. Public libraries must consider the options and make their choice.

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CAB Abstracts: a global view

Blaise Cronin

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This paper summarizes the findings of a recent survey of user reactions to the abstracting services produced by The Commonwealth Agricultural Bureaux (CAB). The study was carried out by the Aslib Research & Consultancy Division and funded entirely by the Commonwealth Agricultural Bureaux.

1. Introduction

THE OBJECTIVE OF the Commonwealth Agricultural Bureaux is to provide research scientists worldwide with useful information on research in agriculture and related subjects. 'Useful information' means, in this context, 'information published in primary journals, books and reports, and judged by CAB to be of good quality'. The medium of provision is high-quality informative abstracts, well indexed by subject/species and author. The abstracts are published in hard-copy form in major series, selections from the whole base being repackaged in specialist journals. The consolidated file is available online as CAB ABSTRACTS. Subscribers to the printed service are distributed over 150 countries. For a more detailed description of CAB's aims and activities the reader is referred to an earlier paper by Metcalfe,¹ and to Scrivenor's *CAB—The first 50 years*.²

2. Survey objectives

This study follows closely on the heels of Harvey's CAB/CAIN evaluation project,³ but differs in a number of important respects. The CAB/CAIN evaluation was a comparative study on the performance of two agricultural databases (CAB ABSTRACTS and AGRICOLA) in a computerized current awareness service. The study focused on a small, select sample of users and concentrated on the technical merits of the two services. The aims of the present study were broader and less specialised (both hard-copy and online users were included in the sample). Briefly, the survey was designed to investigate the following factors.

- types of reader/user
- frequency and types of use made of the publications
- performance (in terms of coverage, selectivity, timeliness, presentation and indexing)
- use of CAB services in relation to other secondary services
- impact of the introduction of online search services on the use of CAB publications
- volume and character of online use

3. Survey design

CAB's subscriber file served as the sampling frame and a computerized algorithm was used to generate a duplicate-free sample. We were keen to avoid sending more than

one questionnaire to multiple subscribers, something which would have happened had a simple random sample been used. Despite a certain amount of 'corruption' within the subscriber file we are confident that a representative sample of subscribers to each of the then 25 main abstracting journals was produced. In designing the questionnaire we tried not to go over ground previously covered by Harvey⁴ and Cleverdon.⁵ The questionnaire had 25 variants in order that the readers of each journal could relate their answers and comments to a named journal.

4. Analysis of results

The analysis which follows is based on replies received from 871 subscribers worldwide. This represents a response of 18.4 per cent, which, though low, is not unreasonable for an international postal survey of this kind. The emphasis throughout this synoptic presentation will be on the general picture, rather than on individual assessments of the journals or the needs and preferences of particular sub-groups.

4.1 *The user population*

In the introduction it was implied that CAB serves only the research scientist. Though true in the most general sense, this is, as we found out, an over-simplification. Because the CAB journals range over such a variety of subject fields (agronomy, veterinary science, forestry, rural sociology, agricultural engineering, to name but a few) it is hardly surprising that the user population is broadly based. Many of those who use the journals (public health inspectors, economists, engineers, chemists, sociologists, zoologists) cannot reasonably be labelled agriculturalists or researchers, despite their occasional or particularized interest in aspects of agricultural research and development. CAB may restrict its database to scientific material, but the database's value is not restricted to the scientific community.

4.2 *Uses made of the journal*

The CAB journals fulfil two primary functions in almost equal measure. On the one hand they have an important updating role, alerting the reader to pertinent developments in his field. On the other hand, they function as bibliographic back-up tools, and can be used for detailed retrospective searching. Only 17 per cent of respondents said that they used the abstracts as a base from which to extract references for an in-house information/SDI service. It may be that the abstracts' lack of currency detracts from their value as input to in-house current awareness systems.

4.3 *Evaluation of the journals*

By aggregating the 25 sets of replies we can come up with an overall picture of user satisfaction with the journals. We asked respondents to indicate how happy or unhappy they were with their journal in respect of the nine features specified in Figure 1. We can see at a glance from Figure 1 that reaction is on the whole quite favourable, with the possible exception of the following (a) coverage of non-conventional literature (b) currency/timeliness (c) back-up document delivery.

4.3.1 *Non-conventional literature*

Literature is deemed conventional or non-conventional depending upon the source or form in which it is made available. The terms non conventional and 'grey' are used

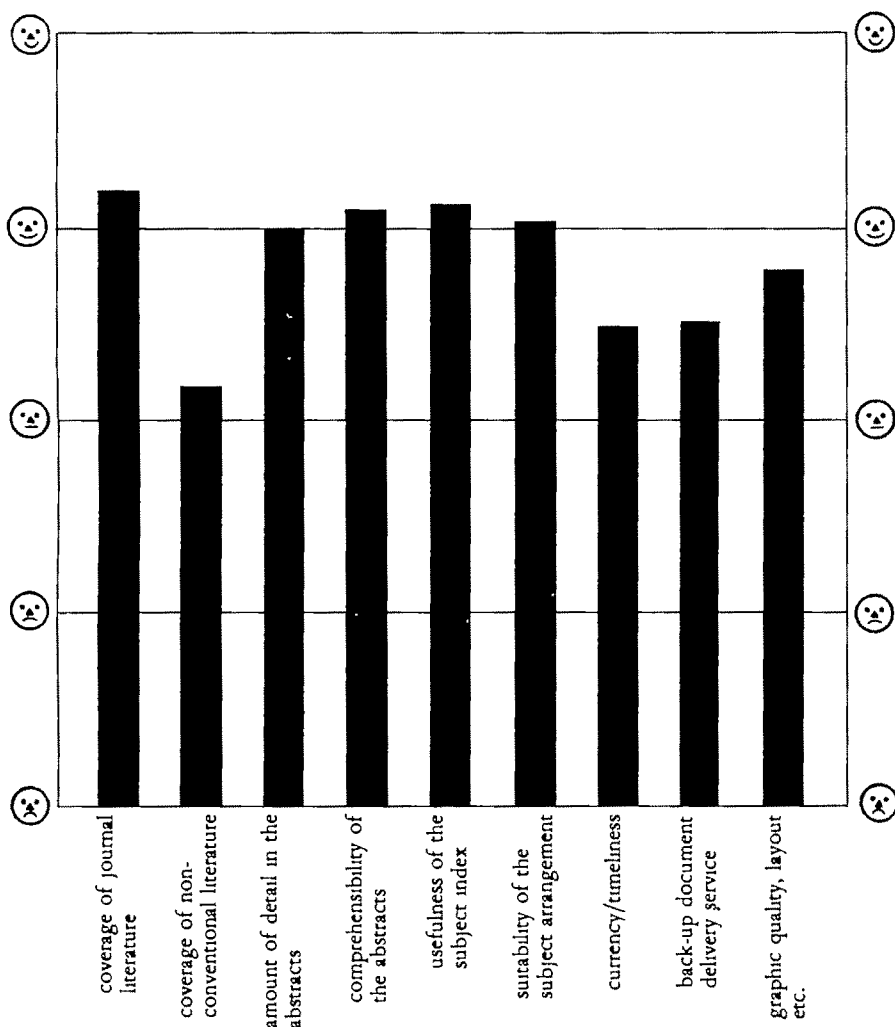


FIG. 1. User satisfaction with various features of CAB journals

interchangeably to indicate material which might otherwise be described as fugitive, semi-published or ephemeral. Examples of the genre are theses, reports, symposia proceedings, advice sheets. The bibliographic control of non-conventional literature is a 'live' issue in agricultural information management at present and has been the subject of considerable discussion.⁶⁷ Although not renowned for its coverage of non-conventional literature, CAB will not exclude material from its database simply because the source is what might be described as non-conventional; selection is based on perceived scientific worth regardless of whether the source is regarded as conventional

or non-conventional. Increased coverage of non-conventional literature was considered 'very important' by 15 per cent of respondents, 'reasonably important' by 44 per cent and 'unimportant' by 41 per cent. These figures would seem to suggest that opinion on the matter is divided, but, as we found out when we looked at the 25 sets of replies individually, not so conveniently divided that we could say that such and such a group would favour enhanced coverage, and another not. The split in opinion was as much inter journal as intra journal. In a sense, this adds up to qualified support for CAB's existing policy of carefully controlled selection.

4.3.2 *Currency/timeliness*

The most frequently voiced criticism of the service was the time lag between the publication of an article and the subsequent appearance of the abstract in the appropriate CAB journal. It may be that the average end-user does not fully appreciate the difficulties faced by secondary service producers in the framework of the prevailing scholarly publication system, but if the customer is always right, then CAB (and other service providers) will have to explore ways in which the process can be accelerated. CAB is aware of the nature and extent of the problem, and is currently investigating ways in which improvements might be made⁸.

4.3.3 *Back-up document delivery*

From the user's point of view locating references is only the first part of a two-step process. Once located, references have to be converted into full-text copies of cited articles. As part of its service CAB operates a document delivery facility for users who do not have ready access to in-house journal collections or to national documentation services. Only a small proportion of respondents were regular users of the service (many had either not heard of it or had never availed themselves of it), but among these there was a perceptible dissatisfaction with the service, which stemmed from the fact that on occasion users were unable to obtain copies of papers cited in the database. From CAB's point of view it is important that demand once stimulated can be satisfied, otherwise the user's frustration may develop into generalized disenchantment with the service. Document delivery is a problematic issue; one which will worsen as a direct consequence of the growth in online searching. A recent study by the Franklin Institute⁹ attempted to forecast future levels of demand in the wake of the Euronet DIANE launch and came up with some rather disturbing figures. Service providers like CAB, which guarantee coverage of thousands of journals will inevitably be faced with requests for material of the hard-to-obtain variety. This situation is a painful but unavoidable corollary of high-quality secondary service provision. It may be that research projects in agriculture can be reckoned in years rather than months, but CAB users are nonetheless intolerant of delays in document provision. The findings of this study suggest that 'non-immediate access', to use Houghton and Prosser's phrase,¹⁰ is a real rather than imagined difficulty. We feel that there is a case for further detailed examination of (a) the extent of 'failure to satisfy' in relation to back-up delivery services generally, and (b) end-users' attitudes to delays in document provision.

4.3.4 *Coverage of journal literature*

CAB's coverage amounts to roughly 8,500 journals, supplemented by reliance on services such as Referativnyi Zhurnal and Dissertation Abstracts International. If, as

Mann has argued, 'the real test of an abstracting service is how far it is able to cover the fringe literature',¹¹ then CAB would appear to have passed that particular test with flying colours; at least that is the impression conveyed by its readers. Apart from some highly specific moans about coverage, each of the 25 journals was rated highly in terms of coverage. The most frequently mentioned reason for preferring CAB journals to other abstracting and indexing services was the comprehensiveness of CAB's coverage. Where CAB may wish to upgrade its coverage is in relation to government reports, doctoral theses and symposia/conference proceedings.

4.3.5 Informativeness of the abstracts

Of the 3 principal agricultural services (Agrindex, Bibliography of Agriculture and CAB), CAB is the only one which offers abstracts. The other two are essentially document locating services. CAB's abstracts tend to be of variable length; some are highly detailed, others merely indicative. Most respondents would be in favour of more detail being included. Certainly there is a need for greater consistency in the information level of the abstracts; too many entries are abstracts in name only, a fact which rankles in some quarters. The abstracts are CAB's strongest selling point (as we shall see later) and it is important that a degree of standardization be achieved and maintained.

4.3.6 Indexing of the journals

Indexing of the journals is by author and by subject (in some cases by species as well as subject). A register of the principal terms used in the indexes to the journals (and in the descriptor field of the database) is currently available and will, in due course, be superseded by an hierarchically arranged thesaurus of agricultural terms. The general picture is one of user satisfaction, but when we analysed the replies journal by journal it was clear that different user groups had different requirements, which might not always be compatible with CAB's overall policy. However, the following recommendations were common across the various sub-groups: more cross-referencing; the inclusion of language indicators next to index entries; the use of geographic entries alongside subject entries. We also detected a small but insistent lobby on behalf of keyword indexing.

4.3.7 The actual and the ideal

We asked CAB users which three of the nine features listed in Figure 1 were, in general terms, most desirable in an information service. This would permit us to compare CAB's performance with what CAB subscribers felt the ideal service should offer. The most important features (in descending order) were coverage of the journal literature, amount of detail in the abstracts, and currency/timeliness. Coverage of the literature received 67 per cent of the first place votes and was by far the most importantly rated. If we turn again to Figure 1 we can see that CAB performs creditably on the first two criterion features but not on the third. The relative importance granted to coverage and timeliness correspond to Whitehall's relevance ratings in the context of a manual SDI system¹²

4.4 Value and function of the abstracts

It is the abstracts which set CAB's information service apart from other secondary services in the agricultural domain. The production of abstracts is a costly business.

At present the bulk of the scanning and abstracting is carried out by CAB's Scientific Information Officers at the organisation's various abstracting units. This operation, which is both time and labour intensive, can only be justified if the end-product is sufficiently appreciated by those for whom it is intended. We therefore asked how users would react if the abstracts were to be scrapped and entries to consist of basic bibliographic data only. The replies were grouped according to 3 categories (see Table 1).

TABLE 1. *Reaction of CAB users to the removal of the abstracts*

'would make no difference to us'	4.3%
'inconvenient but we would continue to use the journal'	44.5%
'the journal would cease to be of value to us'	51.2%

The message is quite clear, if CAB were to discontinue its existing policy of providing informative abstracts then the organisation would be faced with a 50% short-term fall-off in hard-copy subscriptions. These figures demonstrate just what a powerful customer attraction the abstracts are. According to Harvey,¹³ the presence of the abstracts was the main reason why CAB was preferred to AGRICOLA. Table 2 shows how the abstracts are used (as relevance indicators and as document surrogates) and is eloquent confirmation of the user's confidence in CAB's selection and abstracting policy. Abstracts, as Haygarth Jackson¹⁴ has argued, are used by many scientists as substitutes for the original, and this is particularly true in the case of difficult-to-trace, minority language papers. The scrapping of the abstracts, we feel, would result in a massive defection among CAB subscribers, and this survey, if nothing else, has confirmed the widely held belief that the abstracting service provided by CAB is a prized resource of the agricultural researcher.

TABLE 2. *Uses to which the abstracts are put*

	often	sometimes	never
as substitutes for the original	22.3%	65.3%	12.4%
to determine the relevance of the original article	84.3%	14.8%	0.9%

4.5 Use made of other printed secondary services

Agriculture is blessed (or blighted, depending upon your viewpoint) with a large number of secondary documentation services.¹⁶ The 19 most frequently cited secondary services used by CAB subscribers are rank-ordered in Figure 2. A few services (Current Contents, Biological Abstracts and Chemical Abstracts) are heavily cited. The tail (not shown in the figure) consists of fringe services covering peripheral specialisms, plus a wide variety of in-house, regional and national services with limited appeal. Ignoring Current Contents (which is, after all, a slightly different species), CAB's main 'competitors', if we can rightly use the term, would appear to be Biological Abstracts and Chemical Abstracts, rather than the core agricultural services. The information

needs of CAB's polyglot readership can only be met by drawing on a trans-disciplinary array of secondary services. Duplication there undoubtedly is across many secondary services (agriculture included), but as Wyatt observes 'the services themselves are subtly different and are used in different ways for different purposes.'¹⁶

4.6 Review articles

The review article has an increasingly important role to play in the collection and dissemination of scientific research.¹⁷ The role of the review article in relation to the needs of agriculturalists has recently been given serious consideration^{18,19} CAB's policy regarding review articles is somewhat erratic, not all CAB journals carry reviews, and the bulk of the reviews are contained in a select few. The reactions of CAB readers would suggest that a policy of regularly including review articles in the 25 journals would be welcomed. More than 70 per cent of those who replied said that they were in agreement with the idea. However, agreement was by no means universal, we found

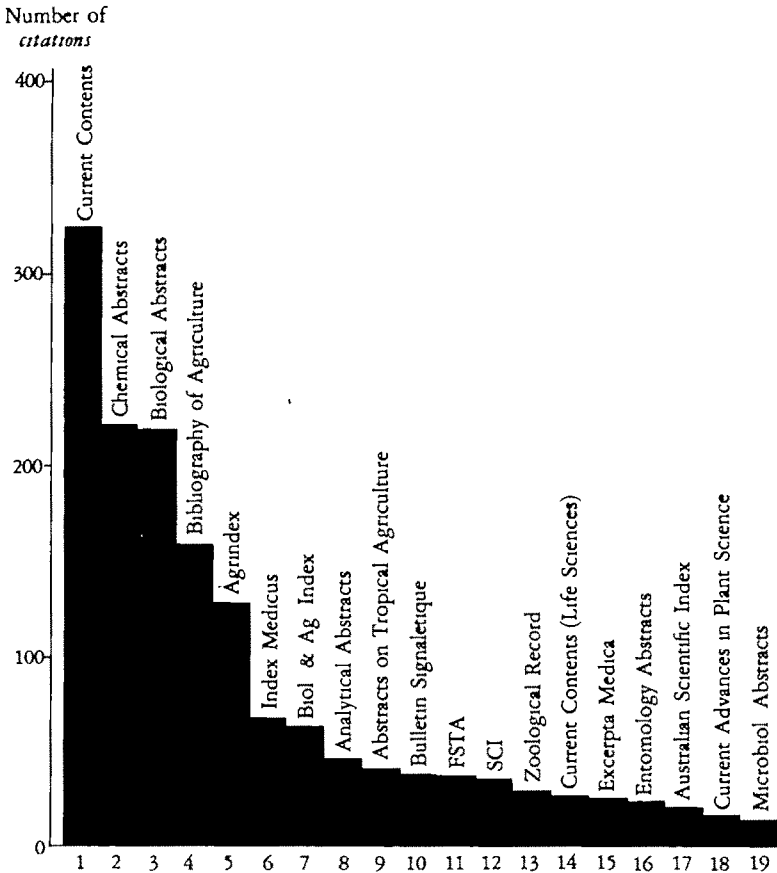


FIG 2 Use made of other printed secondary services by CAB subscribers

that the readers of certain journals were more favourably disposed to the notion than others. There were some misgivings that the pages of an abstracting journal might not be the proper place for review articles, and, also, fears that the reader would be expected to pay more for this value-added feature. On one point there was unanimity, namely, that the authors of review articles should be recognized authorities, and the selected topics of real interest to the target audience.

4.7 CAB abstracts online

User reaction to CAB ABSTRACTS online was based exclusively on replies received from a sample of 'dualists', i.e. hard-copy subscribers who are also online users. The reactions of online-only users were not sought.

4.7.1 Size and character of the online population

Online users were analysed in relation to economic and geographic factors as sensitivity to such factors is extremely important in any study of agriculturalists and their information requirements. Because the bulk of the replies came from the technologically advanced countries (where online use is widespread) the total online use figure (29 per cent) is unreliable. By way of illustration, we calculated that the online figure for the developed English-speaking countries was of the order 35-40 per cent, while the equivalent figure for the less developed countries was approximately 10 per cent. Forecasting growth in the rate of online searching is notoriously difficult²⁰ but these figures underline the differential nature of growth across geo-national boundaries.

4.7.2 Impact of online on hard-copy subscriptions

One of the survey's stated objectives was to investigate the relationship between the uptake of online searching and the fall-off in subscriptions to the printed service. Our findings confirm those of Trubkin²¹ that in certain cases the two modes are complementary. The switch to the online mode does not automatically result in the cancellation of hard-copy subscriptions. Barwise²² recently concluded that the impact of online on print to date had been small. It may well be that the timescale for the transition from the dual mode phase (hard-copy and online co-existing) to the online-only phase will be more generous than predicted. The 'technology-cost-volume-spiral' argument, though appealing, oversimplifies.²³ Almost 90 per cent of CAB subscribers (who were current online users, or who were proposing to become online users of the CAB database) claimed that they would continue their subscriptions to the printed service. Less than 1 per cent said that the switch to online would result in the cancellation of existing subscriptions. The feeling comes across that CAB users try to achieve an ideal blend of search efficiency and cost-effectiveness by intelligently combining online and manual searching in whatever ratio best suits their organisational requirements. The high degree of variance in the online:manual ratios (see Figure 3) reinforces this impression.

4.7.3. Tariffs

Traditionally, online users are appreciably more vocal in their requests for product/system enhancement than subscribers to printed services. It therefore makes sound commercial sense for database producers to heed the criticisms and suggestions of those who use the service. It was in response to public demand that CAB and

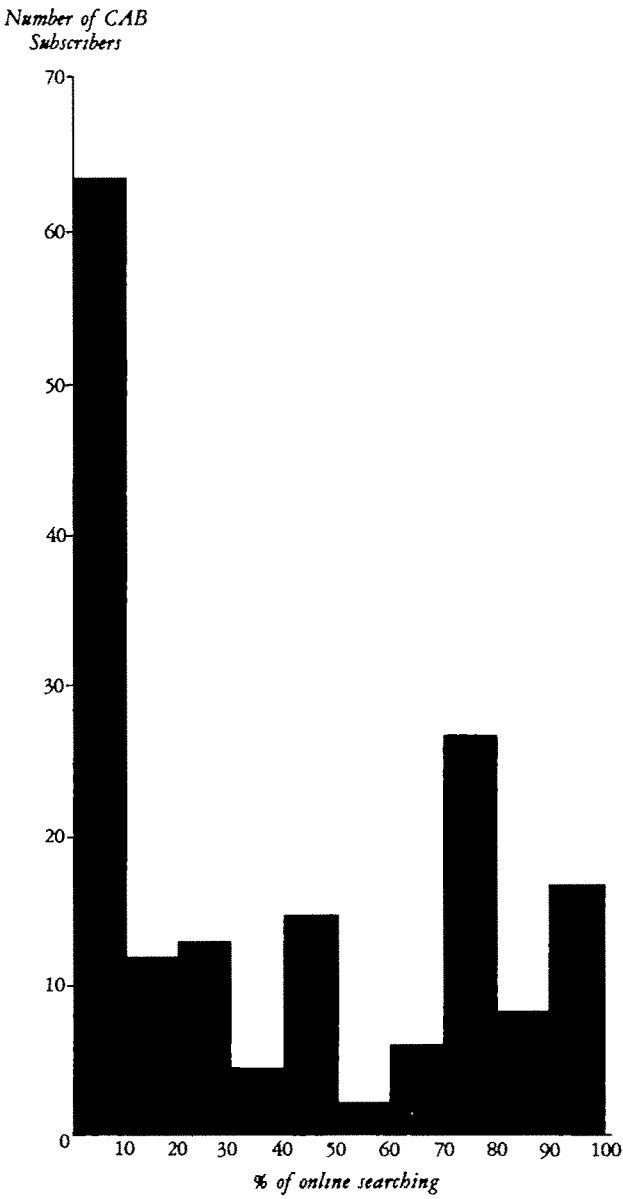


FIG 3. Ratio of online to manual searching using CAB abstracts

Lockheed introduced an experimental pricing structure²⁴ whereby substantial reductions in the dollar connect-hour charge were introduced along with higher online type and off-line print charges. Heuristic searching is thus rewarded and the user pays for the information retrieved rather than for the privilege of searching the database. User reaction to the experimental rates was surprisingly lukewarm, which suggests one of two things; either that not all users fully appreciate the significance of pricing structures in relation to online information retrieval, or that the volume of online searching carried out is a function of demand rather than budgetary considerations. That said, there was sufficiently rich vein of dissatisfaction with the standard dollar connect-hour charge (\$65) to suggest that CAB should continue to experiment with variable pricing structures. The trend is in this direction, as is evidenced by the BLAISE and PSYCHOLOGICAL ABSTRACTS 'live' experiments.^{25,26}

4.7.4. Preferential rates for hard-copy subscribers

Predictably, there was a call for the introduction of special rates for those online users who were also subscribers to the hard-copy service. Generally, hard-copy subscribers feel they have subsidised the development of online systems and that their 'loyalty' to the printed service should be recognised and rewarded in the form of preferential access rates. Hard-copy subscribers argue that the introduction of a two-tier pricing structure would be an incentive to make greater use of the database. CAB could do worse than follow the example of ISI who currently charge hard-copy subscribers \$30 per connect-hour as opposed to \$120 for those who are online users only.²⁷

4.7.5 Duplication within the database

Duplication occurs within the database as a result of CAB's policy of decentralized scanning. An article may be highlighted from a number of viewpoints and, as a result, a multiple record is created in the database. Harvey²⁸ concluded that this duplication across the sub-files was a 'nuisance' but not a problem. Judging by the tenor of some of the comments trawled by this survey it is hard to see how such a charitable stance can be accepted. Online users are a cost-conscious breed, albeit through necessity, and do not like paying for redundant information. CAB, it should be added, is aware of the problem but should be encouraged to pursue its eradication in the interests of good customer relations.

4.7.6 Use made of other databases

The pie charts in Figure 4 illustrate the extent to which CAB's subscribers rely on other major databases. As we saw earlier when looking at the use made of other printed secondary services it probably is more sensible to talk in terms of 'complementors' rather than 'competitors'. Here, again, we have confirmation of Harvey's²⁹ point that CAB ABSTRACTS and AGRICOLA are often used in tandem, despite the element of duplication within the databases^{30,31}. CAB users' need for coverage of cognate subject fields (e.g. applied biology, toxicology, veterinary medicine, food science) is clearly reflected in the names appearing in Figure 4.

5. Conclusions

This summary has of necessity been selective. We have highlighted reactions to certain aspects of the CAB abstracting service and skipped over others. We have, for instance,

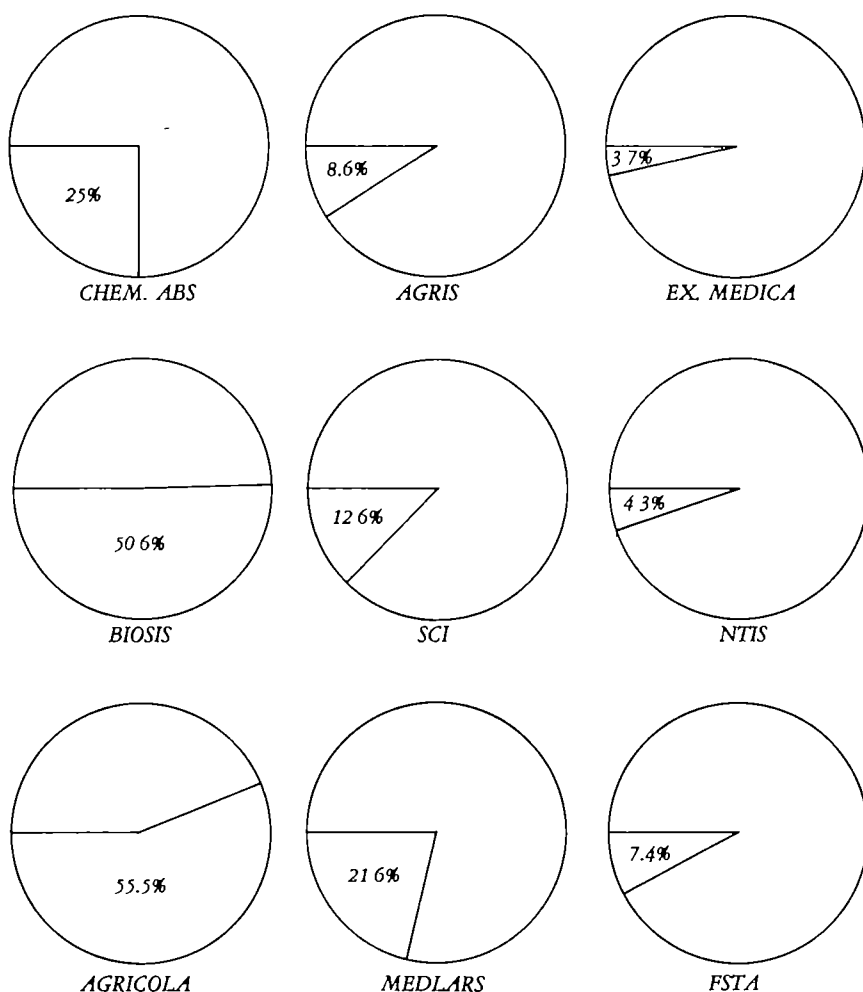


FIG. 4 Major online databases used by CAB subscribers

referred only indirectly to the CAB Word List and have made no mention at all of the online user's manual. We have also omitted to say anything about the actual volume of searching conducted online, or about preferred search strategies. However, a number of recommendations for systems change have been incorporated in the paper (some explicit, some implicit) to which others could usefully be added. We feel that CAB subscribers would appreciate speedier production of the annual cumulated indexes and greater accuracy in the listing of authors' addresses. There is also a strong case for considering dual (linked) index entries for those 'foreign' language articles subsequently available in cover-to-cover translation.

As with most surveys of this kind, users' comments (solicited or not) have proven to be a fruitful source of inspiration. In essence, they confirm the impression that CAB provides an efficient, reliable and selective comprehensive information service tailored to the sectoral needs of its multi-disciplinary user population.

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Requests in biomedicine not available through interlibrary loans

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Of a random sample of 105 requests returned by the BLLD, 50 per cent were for serials. Searches of computerized databases recovered abstracts, indexing terms, or addresses for more than one-quarter of these serials and similar information for another quarter might be recovered by later searches. Fourteen out of fifteen scientists found this information helpful. It is suggested that librarians and information scientists could provide a helpful service on returned requests by cheap computer searches for selected items.

Introduction

A FEW STUDIES have given statistics of interlibrary lending in the UK^{1,2} but no information is available on returned requests. Over 11 per cent, about 1,300 each working day, of interlibrary requests are returned for checking or reapplication.³ In these cases the reader may abandon the search if additional information is not at hand. As no facility exists to help scientists follow up unsuccessful requests, I felt that a study of these requests not available through interlibrary loans might provide data for an improved service.

I think that a large number of returned requests in science might be for articles in foreign or obscure periodicals which are not acquired by the British Library Lending Division (BLLD), are on loan to another reader or are late in arrival. I also assumed that most of these requests may stem from entries in the abstracting and indexing services. My expectation was that some articles would be accessible online so that batch searches could be done to retrieve further information. This information, an abstract, address or indexing terms, could then be returned to the scientist to help him decide if a further search was worthwhile.

To test this hypothesis, I have looked at a sample of returned interlibrary loan requests in the field of biomedicine.

Method

Librarians at the Central Public Health Laboratory, Centre for Applied Microbiology and Research, Boots Company Ltd, London School of Hygiene and Tropical Medicine, Royal Postgraduate Medical School and Leeds University Medical Library, were asked to photocopy and mail all returned BLLD requests in biomedicine every fortnight or month. An addressed envelope was enclosed for each reply together with photocopying instructions and an example of a returned form.

Returned photocopies were analysed when a sufficient number had accumulated. Requests for articles in journals were checked for their cover by major abstracting

and indexing services in journal lists, before batch searches were made online. Searches were carried out using the author and title of each paper on the appropriate computerized database. Full bibliographic data, address, abstract and index terms were printed by the computer. After the printout was examined, information for each request was separated and sent as a letter to the scientist with the question. 'Does this information assist you in determining whether you wish to continue your search for the article requested?'

Results

One hundred and five returns from late December 1979 until April 1980 were analysed. By identifying these requests as serials, monographs, conferences *et al.*, the relative frequencies of total and unfilled requests was calculated (Table 1). Differences exist between total and unfilled request rates for serials and monographs. The BLLD provides a better service for serials with a lower returned rate than requests for other forms of material. Publication language did not affect the number of unfilled requests for monographs, but a greater proportion were for articles in foreign serials. If serial parts too recently published to have arrived at the BLLD (8 titles), are excluded from the results, the percentage of returned requests for foreign serials rises to 30 per cent. Three-quarters of the requests were for items published after 1975 and nearly one-half of these were published in 1979/80. Only 8 requests 6 serials, 1 book and 1 conference proceeding, were for pre-1960 materials.

The BLLD gave information with each returned request (Table 2). Most of the requests for recent publications (monographs and serials) and newly established serials required reapplication after 3-16 weeks. The remainder were for books and popular serials in heavy demand. One-fifth consisted of requests for items with no traceable location in the UK.

Three-quarters of the requisition forms did not specify the type of search required (see footnote Table 2), only two were treated as Z requests. A larger proportion of requests for conference proceedings, reports and theses required the reference to be photocopied (Table 2). Few scientists gave origin of publication, document number

TABLE 1 *Influence of publication form and language on unfilled request rates*

	% Foreign language		% English language		% Total	
	Unfilled	Total	Unfilled	Total	Unfilled	Total†
Serials	26	14.4	74	85.6	52	62.3
Monographs	11	10.9	89	89.1	34	24.7
Conferences, reports theses and official publications	13	—	87	—*	14	13.0
% Total	19	11.7	81	88.3	N=105	>2.8×10 ⁶

†Total number of requests received by the BLLD during 1978/79²

*no data available

TABLE 2 *Replies from the BLLD for unfilled requests*

	N	Reapply	No location ² known	More details ³ required
		%		
Serials	54	48	17	35
Monographs	36	41	22	37
Conferences, reports theses and official publications	15	20	20	60
% Total		41	19	40

¹The requisition may be returned to the reader for reapplication in a specified number (usually 3-16) of weeks, as the item may be on loan to another reader or may not have arrived at the BLLD

²Items requested are not held at the BLLD and no other location (from union catalogues and indexes) is known

³When the reference given is incomplete, incorrect or incomprehensible the requisition may be returned to the reader asking for the reference to be checked and a photocopy to be supplied

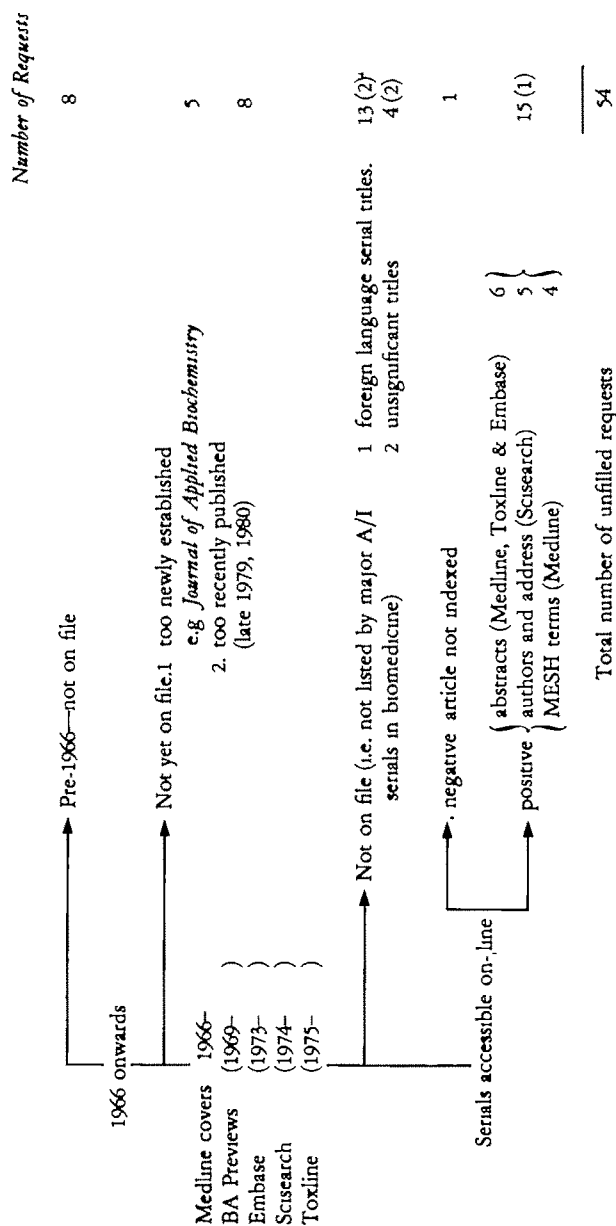
[†]The librarian and/or scientist can decide upon one of three types of search, x, y or z, by marking the requisition form in the appropriate box. An x search is confined to the BLLD stock for serials, and to stock and UK locations for other material requested. A y search covers in addition locations other than the BLLD for serials, and the use of back-up libraries where applicable. For a z search, if no location is found in the UK one may be tried overseas. Requests which are not marked x, y or z are treated as x searches.⁴

or publisher's details with their requisitions, making these items the most difficult to locate. The proportion of ghost requests for publications that do not exist or for items not yet published is difficult to estimate. As far as possible request forms for serials were checked for their validity: 3 requests gave gross bibliographic errors (one article was traced by author's name online), and 2 requests gave non-existent serial titles. About one-quarter of the requests contained minor spelling and bibliographic mistakes.

Computer searches on Medline, Toxline, Embase and Scisearch files, gave information on 15 requests (28 per cent) for articles in serials (Figure 1). This information when sent to the requesting scientists helped all but one to decide if a further search was worthwhile. One-third of the total number of requests for serials included serial titles, mainly foreign, not listed by the major abstract and indexing services. These were not accessible online. Newly established and recently published serial requests formed nearly another third, and although not yet online, would be accessible in the near future. Thus, up to two thirds of the requests for serial articles were retrievable online.

Discussion

It is generally not the BLLD's policy to check failed requests, but bibliographic tools, including computer-based services are often used to verify requests. Requesting libraries carry out checks with varying degrees of thoroughness before submitting their requests. Librarians from smaller institutions may pursue unfilled requests by



*Ghost requests in parentheses.

Fig. 1. Searching strategy and results

writing to the author or journal directly for a photocopy. Scientists themselves may help by collecting a report or thesis when visiting a foreign country. But apart from these practices, which are troublesome, time consuming, and expensive, with long delays, the librarian is still faced with many unfilled requests.

The results indicate that one-half of the unfilled requests in biomedicine are for monographs, conference proceedings, reports and theses. In these cases, the local librarian can do little more than check bibliographic details. CATLINE (catalog online) contains references to books and serials catalogued by the National Library of Medicine. Librarians could find this database a useful source of information for checking and providing complete references on vague inter-library requests. However, a recent study⁶ has shown that the amount of bibliographic checking does not increase the proportion of requests which are satisfied.

The introduction of online terminals and the recent growth of secondary services has meant that most librarians can search a wide range of data bases. With these facilities and computer costs declining by 20-30 per cent per year,⁶ the use of online systems to cope with unfilled requests is possible.

In an earlier study (to be published) I have found that research medical microbiologists use a variety of secondary services. If this is generally true in biomedicine, it is likely that the source of many interlibrary requests would be an abstract or indexing service. This study shows that more than a quarter of the requests for serial articles are directly retrievable and another quarter will be online in a relatively short time. Therefore, more than one-half of the unfilled requests for serials will have entries in secondary services. This is a very large number of requests, for over 3.1×10^6 requests are returned by the BLLD each year.⁸

Carpenter and Narin⁷ found that biomedicine and biology are fields with the largest number of journals collected by the BLLD. They also showed that about one-half of the journals in biomedicine are published outside the USA and Western Europe. From this we might expect a larger demand on the interlibrary loan service for biomedical publications and a larger request rate for foreign publications compared with other subject areas. It is likely therefore, that the satisfaction rate of requests made for biomedical serials is comparatively low. I have shown that requests for biomedical monographs do less well than requests for serial publications and that publication language of serials affects the number of unfilled requests.

This study has shown that searching online for further information does help scientists to persist with unfilled requests. An index or a bibliography may only give the author and title of a paper. Almost all references in Medlars (including Medline and Toxline) now have abstracts and/or indexing terms. Author's name, affiliation and address have been available online since January 1980. Every means of helping a practising scientist is welcome: he is only able to spend a small proportion of his time on information retrieval.

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I wish to thank Ms A. M. Collins, Ms E. M. Read, Ms D. E. Taylor, Ms B. H. Whyte, Mr V. J. Glanvill and Mr T. M. Smith for helping me in this study. I am grateful to the Department of Education and Science for a research studentship in information science.

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Trends in bibliographic publishing in the United Kingdom, 1974-78

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1. Introduction

'The value of bibliography has only been noticeably increased to the extent that the needs of the times call more pressingly than ever before for rearrangement of the economics of intellectual work. The final result is that the method of doing bibliographic work must be regulated so that the simplest possible methods will be applied most suitably, and so that nothing will be done that is not absolutely essential—this is in order that the essential work may be accomplished.'

George Schneider. *The theory and history of bibliography*. (1934)

WRITING IN THE thirties, Schneider could hardly have foreseen the rapid advances in computer applications to the storage and retrieval of bibliographic information that have characterized the seventies, with the resulting 'regulation' offered by increasingly sophisticated systems for the formulation, reformulation and transmission of bibliographic files. This technological development has spanned the era that has both experienced the phenomenon so frequently described as 'information explosion' and that now witnesses the more recent phenomenon identified, so far in a number of guises, as the 'information industry'. Throughout, printed subject bibliographies have had, and will continue to have a vital role in the control of this burgeoning information, and with the rapid development of commercially-based information activities we might expect that these print services will undergo some transformation, both in their scope and in the methods of their generation.

The present survey covers the five year period 1974-1978, and is intended to provide some simple statistical indicators of UK publishing activities involving monographic, individual subject bibliographies, as distinct from the larger abstracting and indexing services (which have recently been analysed very effectively by East¹). A comprehensive file of bibliographies published during this period has been investigated in terms of subject scope, authorship patterns, type of publisher, physical format, contents, and price.

Against these data it may later be possible to study the impact of more advanced bibliographical systems on the conventional print products. We should stress at the outset, however, that the present survey is intended to be indicative, rather than closely descriptive; the difficulties in defining 'bibliography' alone make for uncertainties in any analysis of this type.

2. The survey

Cumulated volumes of the British National Bibliography (BNB) were used as source for the construction of a master file of subject bibliographies for the five-year period 1974–1978. Editions of BNB up to and including December 1979 were checked, to provide as complete a file as was possible at the time of analysis. Class 016 (Bibliographies of Specific Subjects) of the Classified Subject Catalogue collates these publications, and provides the following basic data elements:

- * Dewey Decimal Classification number
- * Feature heading
- * Author heading
 - Title and subtitle
- * Editor, etc., statement
 - Edition statement
- * Place of publication
- * Publisher
- * Price
- * Date of publication
 - Standard Book Number (SBN)
- * Pagination statement
- Illustration statement
- * Other collation data
- * Series statement
 - BNB serial number
 - Notes
 - Tracings
 - Added subject data

Those data elements indicated by an asterisk (*) above have been used for the compilation of the statistics contained in the present report.

Since Class 016 in BNB includes a variety of bibliographic or bibliography-related publications, a number of exclusions were made from the file, in an attempt to secure a degree of homogeneity in the survey population. These included general guides to the literature (i.e. frequently guides to *sources* of information—organizational, etc.—as well as published literature, and sometimes with a reviewing/evaluative content, these have been investigated elsewhere—see, for example, Taylor²), lists of theses (a perennially problematic area, well discussed by Reynolds³), discographies, and lists of periodicals and/or abstracting services. Also excluded were bibliographies appearing regularly and classified as serials, as well as indexing and abstracting publications, we have already referred to a very valuable analysis of UK abstracting and indexing services prepared by East. Further categories excluded were catalogues of individual libraries and collections, and lists of published materials pertaining to a particular institution or event (these are clearly indexed as 'Lists' in the BNB, which allowed their removal without difficulty).

Despite this attempt to define a population of roughly similar publications, however, it has to be said that the resulting file still displayed considerable diversity. This being so it is unwise to make too sweeping generalizations about 'subject bibliography in the UK' on the basis of this analysis; bibliography is characterized by its variety of

forms, and this variety arises out of the different objectives and subjects of the publications themselves. As we have previously suggested, the aim of the present analysis is merely to provide *indicative* quantification on a number of aspects of subject bibliography which might be thought to be of interest to those involved in its commercial development, and in its coordination through the developing on-line systems.

3. Results of analysis

3.1 *Annual output of subject bibliographies*

Figure 1 illustrates the total annual outputs for the five year period in question. The years 1975-78 show a degree of regularity of output, although as will be mentioned later the 1978 total was considerably inflated by an unusually large number of bibliographies of American origin. Printed subject bibliography would seem to be in a relatively 'steady state' at present, with several of the professional and commercial publishing sectors showing interest in its maintenance. Despite this, librarians and academics in particular are aware of distinctive problems in the bibliographical control of certain disciplines (the humanities are much discussed, for example, and the bibliographical confusion there much lamented), and 'steady' may not be a particularly healthy state to be in. There is certainly no evidence from the present survey of subject bibliography growing exponentially as is the literature it is supposed to control.

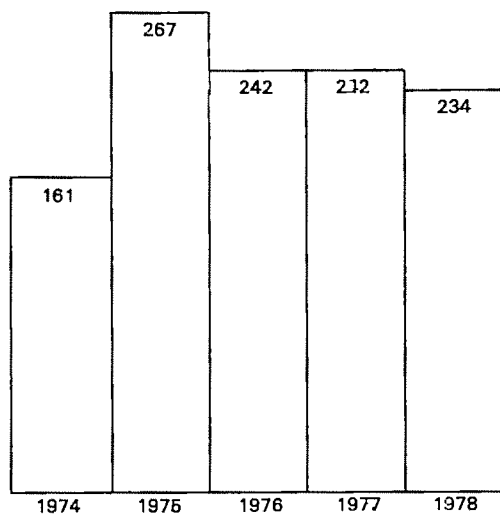


FIG 1 *Annual outputs of bibliographies*

3.2 *Subject scope*

A broad subject breakdown of the bibliographies included in the survey was made, using the convenient framework provided by the Dewey Decimal Classification

adopted by the UK national bibliography. Since the analysis was based only on the ten broad classes of the DDC, it may be helpful here to have an outline of the complete schedules

000	Generalities	355	Military Forces
001	Knowledge	358.4	Air Forces
010	Bibliographies & Catalogues	359	Naval Forces
016	Bibliographies of Specific Subjects	360	Social Services
020	Library & Information Sciences	364	Criminology
028	Reading & Reading Aids	368	Insurance
029	Documentation	370	Education
030	Encyclopaedias	380	Commerce
050	General Periodicals	390	Customs & Folklore
060	General Organisations		
069	Museums	400	Languages
070	Journalism, Publishing, Newspapers	410	Linguistics
080	General Collections	420	English Language
090	Rare Books	430	Germanic Languages
		440	Romance Languages
100	Philosophy & Related	470	Italic Languages
	Disciplines	480	Classical Languages & Modern
110	Metaphysics		Greek
130	Popular Psychology, Parapsychology, Occultism	190	Other Languages
150	Psychology	500	Science
160	Logic	510	Mathematics
170	Ethics	520	Astronomy
180	Ancient, Mediaeval & Oriental Philosophy	526	Geodesy
190	Modern Western Philosophy	527	Celestial Navigation
		530	Physics
		540	Chemistry
200	Religion	548	Crystallography
210	Natural Religion	549	Mineralogy
220	Bible	550	Earth Sciences
230	Christian Doctrine	551.5	Meteorology
270	Christian Church Historical & Geographical Treatment	560	Palaeontology
280	Christian Church, Denominations & Sects	570	Life Sciences
290	Non-Christian Religions	572	Ethnology
		573	Physical Anthropology
		574	Biology
		580	Botanical Sciences
		590	Zoological Sciences
300	Social Sciences	600	Technology
301	Sociology	610	Medical Sciences
301.1	Social Psychology	620	Engineering
309	Social Conditions	630	Agriculture
310	Statistics	634.9	Forestry
320	Political Science	635	Gardening
327	International Relations	636	Livestock, Domestic Animals
330	Economies	639	Hunting, Trapping, Fishing
340	Law		
350	Public Administration		

640	Household Management	796	Sports & Games
647	Institutional Management		
650	Business Practices	800	Literature
657	Accounting	810	American Literature
658	Management	820	English Literature
660	Chemical Technology	830	Germanic Literatures
664	Food Manufacturers	840	Romance Literatures
669	Metallurgy	870	Folk Literatures
670	Manufactures	880	Classical & Modern Greek Literatures
690	Building	890	Other Literatures
700	Fine Arts		
710	Civic & Landscape Art	900	Geography, History & their Auxiliaries
711	Town & Country Planning		
720	Architecture	910	Geography & Travel
730	Sculpture & Plastic Arts	920	Biography
737	Numismatics	929	Genealogy & Heraldry
740	Drawing & Decorative Arts	930	Ancient History
750	Paintings	940	History Europe
760	Graphic Arts	950	History Asia
770	Photography	960	History Africa
780	Music	970	History North America
790	Recreation	980	History South America
791	Public Entertainment	990	History Oceania, etc
793	Indoor Games & Amusements	999	History Extraterrestrial Worlds

A number of the subject bibliographies studied were naturally given a primary classification and one or more subordinate classifications, consequently appearing several times in the BNB. In all cases the primary classification was the only one retained for the purposes of the present analysis. Although bibliography will very often be interdisciplinary, this adherence to the primary classification should not affect the reliability of the statistics presented here too seriously, the use of the broad classes (18th Edition, as used for the years covered by the present survey, 1974-78) for analysis helps to reduce the loss of items which span more than one discipline.

The results of the analysis of the period 1974-8 are presented in Table 1.

What is perhaps most noticeable about these figures is the regularity of the incidence of subjects over this period—for example, in the social sciences, which represent approximately one third of each year's production of bibliographies. The next largest group, Technology, displays a similar evenness of production, though with a slight decline in the years 1977/78 (this may be due to the late reporting of publications for these years, which has not yet taken place). The remaining categories represent roughly constant proportions of each year's total output.

Science and Technology combined consistently provide fewer bibliographies than the social sciences, which is interesting in the light of the considerable expansion in the published literature of these sectors. Not unexpectedly, Literature attracts the next highest level of bibliographic attention, particularly in the field of English literature, where bibliographical control is relatively highly developed, both in range and depth.

TABLE 1 *Subject scope of bibliographies*

	1974	1975	1976	1977	1978
GENERALITIES	6 (4%)	13 (5%)	12 (5%)	12 (5%)	11 (5%)
PHILOSOPHY AND RELATES DISCIPLINES	4 (2%)	5 (2%)	4 (2%)	6 (2%)	8 (3%)
RELIGION	7 (4%)	4 (1%)	2 (1%)	6 (2%)	5 (2%)
SOCIAL SCIENCES	50 (31%)	90 (34%)	77 (32%)	68 (28%)	71 (30%)
LANGUAGES	5 (31%)	4 (1%)	4 (2%)	7 (3%)	2 (1%)
SCIENCE	12 (7%)	6 (2%)	18 (7%)	21 (9%)	6 (3%)
TECHNOLOGY	37 (23%)	64 (24%)	55 (23%)	35 (14%)	34 (15%)
FINE ARTS	9 (6%)	15 (6%)	9 (4%)	8 (3%)	18 (8%)
LITERATURE	16 (10%)	39 (15%)	25 (10%)	42 (17%)	53 (23%)
GEOGRAPHY/HISTORY	15 (9%)	27 (10%)	26 (11%)	37 (15%)	26 (11%)
T=	161	267	242	242	234

3.3 Publishers

In view of the general development of commercial bibliographic services, ranging from the monographic bibliographies analysed here through to the major on-line data bases, the activities of the various publisher groups in subject bibliography are particularly interesting. In order to study these more closely, we present below the characteristics of those bibliographies produced by a number of different publishing sectors during the year 1977, this being the most recent year for which sufficiently full coverage can be obtained from the BNB record. A total of 242 publications were identified and analysed.

For the purposes of analysis, publishers have been grouped into the following broad classes:

- Commercial
- Academic
- Learned/professional societies and institutions
- Research/development/trade associations
- Government
- Local government

This is a familiar classification, and is broadly satisfactory, although some blurring of the distinction between the publishing interests of the commercial and other sectors invariably occurs; this in itself is perhaps an indication of the growing range and diversification of an 'information industry', in that previously non-commercial sectors, such as the universities and the research associations, are now coming to recognize the information resources at their disposal as a commodity, and are therefore seeking publishing outlets in order to capitalize on this. As we shall see from later data, these and other institutions now have a marked interest in the commercial publication of subject bibliographies.

Full-time *commercial publishers*, play the precominant part in the publishing of subject bibliographies in the UK. It may be seen from Table 2, however, that in 1978 roughly equivalent numbers of bibliographies of UK and US origin were published in the UK. A considerable proportion of these foreign publications were produced by American university presses. The majority of the year's output was prepared by a single author, and almost one third were of less than a hundred pages. Despite this, it will be seen that the prices of bibliographies from this sector are generally higher than those from other publishers. Provision of an index was also most common amongst the commercial bibliographies, however, and 31% were designed as part of a bibliographical series.

TABLE 2 *Characteristics of bibliographies, by publisher (1977)*

	COMMERCIAL	ACADEMIC	LEARNED/PROFESSIONAL	RESEARCH/DEVPT/TRADE	GOVERNMENT	LOCAL GOVERNMENT
SINGLE AUTHOR	99 (72%)	21 (68%)	12 (52%)	5 (29%)	16 (62%)	5 (71%)
NO AUTHOR IDENTIFIED	19 (14%)	4 (13%)	7 (30%)	2 (12%)	4 (15%)	2 (29%)
PLACE OF PUBLICATION UK	69 (50%)	31 (100%)	23 (100%)	17 (100%)	26 (100%)	7 (100%)
US	67 (49%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
PAGINATION 1-99	41 (30%)	22 (71%)	16 (70%)	12 (71%)	19 (73%)	6 (86%)
100-199	32 (23%)	6 (19%)	1 (4%)	4 (24%)	4 (15%)	0 (0%)
200-299	26 (19%)	1 (3%)	2 (9%)	0 (0%)	0 (0%)	0 (0%)
300-399	14 (10%)	1 (3%)	1 (4%)	1 (6%)	1 (4%)	1 (14%)
400-499	6 (4%)	0 (0%)	1 (4%)	0 (0%)	2 (8%)	0 (0%)
500-599	10 (7%)	1 (3%)	1 (4%)	0 (0%)	0 (0%)	0 (0%)
600+	11 (8%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)	0 (0%)
PART OF SERIES	43 (31%)	2 (6%)	2 (8%)	4 (24%)	6 (24%)	1 (14%)
INDEX PROVIDED	111 (80%)	13 (42%)	8 (35%)	10 (60%)	6 (24%)	2 (29%)
PRICE Less Than £1	7 (5%)	11 (35%)	10 (43%)	3 (18%)	2 (8%)	0 (0%)
£1-£5	28 (20%)	14 (45%)	6 (26%)	4 (24%)	7 (27%)	3 (43%)
£5-£10	23 (17%)	2 (6%)	2 (9%)	2 (12%)	3 (12%)	0 (0%)
£10-£15	30 (22%)	1 (3%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)
£15+	37 (27%)	0 (0%)	3 (13%)	1 (6%)	1 (4%)	0 (0%)
UNPRICES	13 (9%)	3 (9%)	2 (8%)	5 (30%)	13 (50%)	4 (57%)
T =	138	31	23	17	26	7

In order to illustrate the range of publishing houses involved, a list of all commercial publishers featuring in the master file for the full five year period is included at the end of this article.

The pattern of single authorship is repeated amongst those bibliographies published

by *academic institutions*, amongst the latter academic libraries feature prominently. Again, a majority were brief publications of less than one hundred pages, but here prices fell more squarely in a medium range of between one and five pounds sterling. Bibliographies arising from this sector, which represent about 13 per cent of the total production for 1977, will most probably be based on the existence of strong special collections. This holds true for the *learned and professional societies* and the *research associations*, which have already established themselves firmly in the production of abstracting and indexing services over a wide range (see East¹), and which show themselves to be similarly active in the publication of printed subject bibliographies of the type under consideration here.

Government libraries have traditionally played a significant part in the world of bibliography, this also usually being based on the availability of outstanding collections in well-defined, though often broad, disciplinary areas. The fact that more than 50 per cent of those produced in 1977 were unpriced may indicate that commercial interest in this sector is not of primary significance, although over a quarter of those bibliographies identified fell into the one to five pounds bracket. Roughly equivalent proportions of those publications arising from government and local government sources formed part of larger series, and in these sectors more than any of the others the characteristic publication was of less than one hundred pages. In total, these sectors accounted for approximately 14 per cent of the total production in 1977.

3.4 *Authorship*

(N.B. In this and following sections we have paid particular attention to two years—1974 and 1977—which display different levels of production of subject bibliographies, and for which we have the fullest possible record (taking into account delays in the appearance of items in the BNB, see section 4 of this article). Data for these two years are presented alongside each other throughout).

Who are the bibliographers, and how do they work? The data analysed here suggests that bibliography is still a solitary craft—nearly 60 per cent of bibliographies published in 1974 and 65 per cent in 1977 were produced by one person, according to entries in the BNB. 'Author', 'editor' or 'compiler' statements are of course open to some interpretation where bibliographies are concerned, since the range of tasks involved may vary considerably from one bibliographic project to another. Joint authorship involving two or more persons was considerably less common than the single author, and a number of the materials studied here identified no author at all. Such anonymity is perhaps a welcome cloak for the incipient ills of the bibliographer—Elliot Coues, writing in 1897 of his experience with the *Universal Bibliography*

TABLE 3. *Authorship of bibliographies*

	1974	1977
Single author	95 (59%)	156 (65%)
Joint authors		
Two	25 (16%)	51 (21%)
Three	9 (6%)	10 (4%)
No author identified	32 (20%)	25 (10%)

of *Ornithology*, offered the view that 'it takes a sort of inspired idiot to be a good bibliographer, and his inspiration is as dangerous a gift as the appetite of the gambler or dipsomaniac—it grows with what it feeds upon and finally possesses its victim like any other invincible vice.'⁴

3.5 *Place of Publication*

Whilst the data naturally indicate that the majority of bibliographies published in the United Kingdom actually originate there, it is worth noting the incidence of bibliographies originating in other countries, particularly since 1977 saw a considerable inroad into the UK market made by a small number of American publishing houses (Scarecrow, Garland, G. K. Hall) who launched complete sets of bibliographies. Their inclusion in the BNB, which is generally recognized to have a potentially valuable marketing function, therefore shows up as a large number of items with a primarily US imprint though published in this country also. Table 4 illustrates this partial distortion of the data for the two years:

TABLE 4 *Place of Publication*

PLACE OF PUBLICATION	1971	1977
United Kingdom	146 (91%)	173 (71%)
United States	12 (7%)	67 (28%)
Ireland	3 (2%)	—
Australia	—	2 (1%)

It seems likely that the 1974 figure of approximately 10% for bibliographies originally published abroad is the more typical, and where other countries than the US and Australia appear in the data for other years, they also are most commonly English-speaking or at least familiar with English—for example, India and Canada. We would stress here again that these findings are tentative, since a number of houses publish simultaneously in several countries, and from the BNB record it is sometimes difficult to pinpoint the exact origin of many of these

3.6 *Pagination*

The BNB record provides a number of data elements related to the physical characteristics of the items included, but for our purposes we have considered only the pagination of bibliographies, in order to provide some indication of the most common formats of these publications.

The analysis reveals that most UK bibliographies are not substantial monographs, but rather have a relatively small number of pages and only infrequently extend beyond 300 pages. For the years 1974 and 1977, 66% and 47% respectively of all the bibliographies were of less than one hundred pages, whilst 89% and 78% were within the three hundred page limit. Page length is to some extent reflected in lower price, but since bibliography in itself usually relies on extensive intellectual effort, any attempt to link book length and price can only be highly tenuous at best. What might perhaps be suggested is that as the total corpus of published materials becomes more

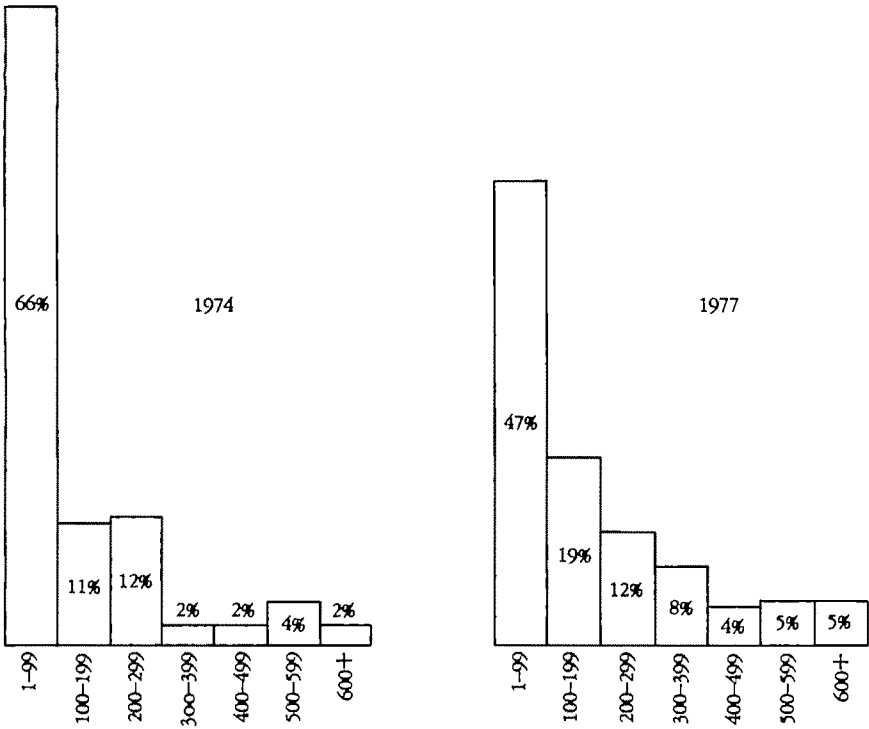


FIG. 2. *Pagination*

extensive, individual bibliographies may become more specific or selective, with less opportunity for the major, 'universal' bibliography to reach print (probably because of the current economies of publishing, and possibly because of the existence of such bibliographies as machine files).

3.7 *Series of bibliographies*

Approximately one third of the bibliographies surveyed formed part of bibliographic series, as identifiable from the BNB record (this identification based on the imprint; other publishers may have a programme for such bibliographies, without organizing them into a continuing series). Such series were to be found in all types of producer, but particularly amongst the bibliographies produced by government and other special

TABLE 5 *Series of bibliographies*

	1974	1977	1974 + 1977
BIBLIOGRAPHIES FORMING PART OF SERIES	61 (38%)	58 (24%)	119 (30%)

libraries, by research associations and by a small number of specialized bibliographic publishers. The advantages to the publishers of such series may be several, including the formulation of a more identifiable product (important to libraries as publishers as well as to commercial publishers), ease of ordering (perhaps through standing orders), and the inherent efficiencies of establishing editorial and production patterns for a series of publications.

3.8 *Inclusion of index*

Advocates of the index as a desirable feature of any bibliography can draw relatively little comfort from the findings presented here. Of a total of 403 bibliographies reported in 1974 and 1977, only 55% boasted an index. This is mitigated to some extent by the selectiveness of many of the bibliographies published, but it appears that indexing is not regarded as an essential part of bibliographic publishing, by either compilers or publishers. Without closer inspection of the actual publications, however, it would be unwise to press this issue too far, since *bibliography* and *indexing* are structurally related, and their functions may be adequately expressed in the particular format of any one publication; the simple distinctions between text, author index, subject index, etc. do not apply very easily to this category of published literature.

TABLE 6 *Inclusion of index*

	1974	1977	1974+1977
WITH INDEX	73 (45%)	150 (62%)	223 (55%)
NO INDEX	88 (55%)	92 (38%)	180 (45%)

4. *Currency of BNB in reporting bibliographies*

Additional evidence is available from the analysis of the largely inevitable delays in the reporting of bibliographies (as, indeed, of all types of publication) through the national bibliography. Data for the years 1974-77 only are presented below (Table 7) since we may reliably expect that the reporting of bibliographies published in 1978 has not yet been completed through BNB.

TABLE 7 *Date of inclusion in BNB*

REPORTED IN PUBLICATION YEAR	REPORTED IN FIRST YEAR AFTER PUBLICATION YEAR	REPORTED IN SECOND YEAR AFTER PUBLICATION YEAR	
1974 66 (41%)	58 (36%)	33 (20%)	=(97%)
1975 86 (32%)	163 (61%)	5 (3%)	=(96%)
1976 117 (48%)	75 (30%)	33 (14%)	=(92%)
1977 67 (28%)	138 (57%)	37 (37%)	=(100%)

It will be seen that something less than half of the bibliographies published each year are reported in that year in BNB (as low as 28% in 1977), with roughly equivalent or greater numbers reported during the first calendar year following publication year. Proportions reported during the second year after publication year are somewhat less, though in three of the four years analysed this accounted for more than 10% of the total, and in the case of 1974, 20% of its bibliographies were announced during this second year.

This is a familiar phenomenon, and is attributable to a number of factors,⁵ some intrinsic to the systems for the production of the national bibliography and others extrinsic, such as errant publishers failing to supply deposit copies of their publications, or simple changes in publication date over that indicated in the published item. We do not wish to make out a case for the particular seriousness of this phenomenon in relation to bibliographic publications, except to suggest that the preparation of a bibliography may be a lengthy process in itself, and where there is an emphasis on currency or recency of the references included, then further delays in dissemination through the various reporting channels (of which the BNB is only one, though a significant one for librarians; see Lewis⁶) may be undesirable. Alongside this, however, we should stress that the national bibliography can not be regarded as the single source for the identification of subject bibliographies since, as we have already mentioned, a respectable number of these are not published in a conventional sense, and will therefore not make their way into the national lists. In this case other alerting mechanisms, such as *Aslib Information* and other library/information newsletters in the UK, assume real importance.

5. Summary

In many ways a survey of the present type can only be regarded as skimming the surface of some of the more vital features of the publications with which it is concerned. This is particularly so in the case of the analysis of the bibliography, which is a species prone to hybridization, and which best reveals its true properties only on detailed individual analysis. The development of bibliometric techniques and their application to bibliographical compilations of all types offers the best hope of a deeper understanding of subject literatures and, in turn, of the commercial mechanisms which exist for their promotion.

Measures used in the present study, therefore, such as simple page counts, are somewhat crude indicators, number of references included, and conditions of inclusion or exclusion of materials are more incisive descriptors of bibliographical activity. Nevertheless, the data presented here do show a number of interesting features. The relative stability of the output of bibliographies of individual subjects over the five year period does not fulfill the common expectation of growth in this sector—expressed as a proportion of total output of published items of all types, in fact, this might even constitute a relative deterioration. The data help to quantify the pre-eminent interest of the commercial publisher in this area, involving a wide range of houses (see list at end of this article); a small number of these publishers are also substantially involved in the publication of abstracting and indexing services, and we may perhaps expect to see a growth in the 'repackaging' of bibliographical data into new print products. Up to 1978, however, the on-line bibliographical data bases had apparently made little

inroad into the domain of these printed subject bibliographies. The prognoses of the likely changes in this relationship, and their consequences for the information industry, vary considerably, and a sophisticated analysis of publishing activities is necessary before we can be definitive—even then the very unpredictability of the information sector may render such conclusions elusive.

A number of more detailed studies would therefore help to illuminate some of the general findings presented here. What is the optimum price/number of references, and in which publisher groups and/or discipline do these occur? To what extent are machine files used by the compilers of printed bibliographies, either for the whole publication or to supplement other sources? How well served are the various disciplines by bibliographies of individual subjects, and to what extent is interdisciplinarity catered for by these publications? How marketable are subject bibliographies, and what factors influence publishers to produce materials of this type? Is the range of bibliographic publishers increasing or decreasing? Answers to these and similar questions will help us to better describe and understand one sector of an information industry which already displays considerable complexity.

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ACKNOWLEDGEMENT

The present study was conducted with support from the British Library Research and Development Department, which is gratefully acknowledged.

6. Commercial publishers

This list names all commercial publishers producing bibliographies of individual subjects in the UK during the period 1974-78, as announced in the British National Bibliography. UK and foreign publishers are included.

Aardvark House
ABC-Clío
Akros Publishers
Ascent
Bingley
Blackwell

Bowker
Brainchild Information
E. J. Brill
Business Information Press
Business School Press
Butterworth

-
- | | |
|-----------------------------------|--------------------------------------|
| University of California Press | Inter Documentation Company |
| Cambridge University Press | Intermediate Technology Publications |
| Carcenet Press | Irish University Press |
| CBD Research | Janus Press |
| Ceramic Book Company | Johns Hopkins University Press |
| R. H. Chandler | Lawrence and Wishart |
| Cheshire Publishing | University of London Press |
| University of Chicago Press | Macdonald and Janes |
| Clarendon Press | Macmillan |
| Clover Publications | Martin Robertson |
| Collier Macmillan | Manchester University Press |
| Columbia University Press | Mansell Information Publishing |
| Cornell University Press | MIT Press |
| Croom Helm | University of Missouri Press |
| Crown Books | C. V. Mosby Company |
| Dawsons | MPA Publications |
| Deutsch | MTP Press |
| Diploma Press | University of Nebraska Press |
| Dolphin Book Company | Noyce |
| Edinburgh University Press | Oleander Press |
| Elsevier | Open University Press |
| Emerson Rowat Information | Oxford University Press |
| Europa | Pennsylvania State University Press |
| Feffer and Simons | Pergamon |
| Ferret Fantasy | Pitman |
| Frances Pinter | Plenum Press |
| Free Press | Pluto Press |
| Garland | Praeger |
| Geo Abstracts | Princeton University Press |
| Golden Eagle Books | Prior |
| Gordon and Breach | Professional Books |
| Grant and Cutler | Release Publications |
| Greenwood Press | Research Publishing Company |
| Grove Books | Richmond Publishing Company |
| G. K. Hall | Rudolf Steiner Press |
| Harper and Sons | Sage Publications |
| Harvester Press | Saxon House |
| Hemisphere Publishing Corporation | Scarecrow Press |
| HMSO | SCM Press |
| Holmes and Meier Publishers | Scolar Press |
| Housmans | Smoothie Publications |
| Ian Hodkins Company | Southern Illinois University Press |
| IFI/Plenum | Sturlock |
| University of Illinois Press | Tavistock Publications |
| Indiana University Press | University of Texas Press |
| Information Retrieval Ltd. | Times Newspapers |
| Institute of Scientific Business | T. Q. Publications |

University Park Press
 Vikas Publishing
 University of Wales Press
 University of Washington Press

White Lion Publications
 Wiley
 University of Wisconsin Press
 Wolfhouse Press

Acquisitions and their processing in Edinburgh University library: results of a survey

Derek G. Law

Edinburgh University Library

A survey of acquisitions over a three month period used the same methods as earlier unpublished surveys conducted by four neighbouring university libraries. Acquisitions are analysed by country, language and date of publication. The time taken to acquire publications is measured. The currency and coverage of centrally produced cataloguing records are discussed. Some comparisons with earlier results are made

Introduction

WHEN EDINBURGH UNIVERSITY LIBRARY first began to discuss seriously possible applications of automation to the library, it quickly became evident that a much clearer picture was required of how the present manual systems operated. Many statistics were collected already, usually for outside bodies such as the University Grants Committee or the university administration, but they were quantitative rather than qualitative, recording 'how many' rather than 'how well'. It was therefore decided to concentrate on an examination of the processing departments.

Previous surveys examining the performance of acquisitions and cataloguing processes were known to have been conducted in four Scottish university libraries, although the results were never published. In 1973, the six libraries which were to become the founder members of the Scottish Librarians Co-operative Automation Project (SCOLCAP) undertook such surveys as part of an examination of the feasibility of the project. The six included the university libraries of Dundee, Glasgow and Stirling. Although strictly carried out before the formation of SCOLCAP, these are hereafter called the SCOLCAP surveys, for convenience. In 1976, St Andrews University Library repeated the survey, in a slightly modified form, prior to its application for membership of SCOLCAP. It was decided that Edinburgh should follow the pattern of these previous surveys, making only such changes as were dictated by local needs or practices. This would enable us to benefit from previous experience, it would provide a check on the validity of some of our results and would offer some comparative data for the period 1973 to 1979 on university library acquisitions and cataloguing processes, for although each university library is clearly different, there are some similarities.

Method

The previous surveys had all been conducted at the same time of year and for the same period of time, that is from the beginning of December until mid-February. During that period, pre-printed survey cards were inserted into all books processed

in the library. The number of items recorded in each library in the four earlier surveys varied from 946 to 2302¹ and it took several more months for all the cards to move through the complete processing system. So, from the beginning of December 1978 until mid-February 1979, similar cards were inserted into all books received or recatalogued in all sections of Edinburgh University Library. The cards accompanied the books through the library, accumulating information about the books and about the speed of each step in the processing system. It took until May 1979 for all the cards to be completed and for problem items to be tracked down. The information was keypunched and then validated over a two month period. Finally the results were tabulated using the Statistical Package for the Social Sciences (SPSS). A management report was then written, based on these results, an abstract of which was presented to the Library Committee in October 1979. Although the library now has an incomparably clearer picture of its operations, it is salutary to note that even by using an existing methodology, such a survey took almost exactly one year to complete, from the decision to conduct it to the presentation of the report.

Results

4129 survey cards were completed, almost double the number of any of the previous surveys. The information they contained fell into several broad groups:- what we purchased; how long we took to get it, how long it took to reach the shelves; how long entries took to reach the catalogue; the amount of MARC material and the performance of the British National Bibliography (BNB). Edinburgh University Library is a long-established library, based on an urban university and composed of a large number of scattered sections, some large and well-known libraries in their own right, although apart from the 'Main Library'. This meant the production of several hundred tables, from which reports could be written on each section of the library. Combined tables were also produced for the whole library. Most of these results are so specific to Edinburgh University Library's practices and procedures as to have no general interest. However, there are a number of results which seem worth wider dissemination.

Country of publication

The traditional formula for a university library's acquisitions of periodicals has been one-third British, one-third American and one-third the rest of the world, although this last third is usually predominantly European. Evidence that this traditional mixture was broadly true came from a study in the University of Sheffield in 1968-69.² Their figures were 33.8% British, 28.5% for the United States-only and 37.7% for the remainder, of which 23.24% came from the major publishing countries of Europe. The results for the acquisition of books proved to be very different.

Obviously, the particular interests of a university will to some extent dictate the country of publication of its acquisitions. In Edinburgh's case, the figure for European acquisitions is probably lower than average, as many of our principal interests lie elsewhere. The figures for UK purchases seem more typical; the SCOLCAP surveys found figures from 41%-51%. They also found that the number of books published

TABLE 1 *Country and date of publication of Edinburgh University Library acquisitions*

Date of publication	UK %	USA %	W Europe %	Other %	Total %
pre-1950	5.8	0.9	1.5	2.4	10.6
1951-70	5.1	9.7	1.1	1.0	16.9
1971-75	7.2	4.0	1.9	1.1	14.2
1976-79	31.3	12.4	9.6	5.0	58.3*
Total	49.4	27.0	14.1	9.5	100.0

*Only 1.2% of books were published and received in the first two months of 1979

in the last three years—strictly three years and two months—ranged from 56%–70% and our figure falls at the bottom end of that range

Books were acquired from forty-nine countries in all. Since we prefer to purchase from the country of origin, this indicates the wide range of work involved in a large acquisitions department

Language of publications

Given the figures in table 1, it was to be expected that most of Edinburgh's acquisitions would be in English and this proved to be the case. The study in Sheffield³ in 1968–69 also produced figures on the language of acquisitions and these are given for comparison

Clearly, results will vary from library to library, depending on acquisitions policy, but it seems unlikely that the predominance of English will prove exceptional. The results from the SCOLCAP and St Andrews surveys suggest that the figures from both Edinburgh and Sheffield are high for English and that a figure closer to 75% is more 'average'.

In Edinburgh's case, the reasons for this are fairly clear. Firstly and most importantly come our own interests. We have particular interests in Canada and in English-speaking

TABLE 2. *Percentage of items accessioned, by language*

Language	Edinburgh %	Sheffield %
English	86.02	82.00
German	2.93	2.85
French	2.72	4.98
Russian	1.72	1.95
Italian	1.72	3.10
Spanish	1.11	3.57

Africa; naturally, the books purchased from and about these areas are predominantly in English. Edinburgh also operates a generous duplication policy for undergraduate textbooks and these are overwhelmingly in English. Secondly there is the proximity of the National Library of Scotland. The fact that another major library with great collections exists only five minutes walk from the university library and is open to most of our readers leads, obviously, to co-operation in acquisition and this is undeniably of value. However, it does inhibit the growth of areas of our collections where duplication and competition would clearly be wasteful. This explains, at least in part, the small number of acquisitions in a subject such as German language and literature where the National Library's collections are stronger than ours.

Another factor, although this will apply to all libraries, is the well documented lack of proficiency among researchers in the use of foreign languages. It seems unlikely that academic staff will recommend many books which they cannot read. French and German are the only languages which command more than minimal comprehension⁴ and it is therefore hardly surprising to find these languages most frequently represented in acquisitions, next to English. Works in other languages are largely attributable to the language department concerned.

Books were received in twenty-six languages, showing the wide range needed, albeit small in volume, in a large university. It also demonstrates the wide, if superficial, language demands made on library staff.

Date of order to date of receipt

Clearly the source of a publication affects the length of time until its arrival. Edinburgh uses a number of booksellers in the UK and spreads orders more or less evenly between them, but concentrating, naturally, on the few listed on our Library Licence. For foreign items our preference is to use one or two booksellers in the country concerned.

TABLE 3 *Date of order to date of receipt by country*

Time	UK (1617)	USA (704)	W. Germ. (109)	France (89)	Holland (74)	Italy (70)	USSR (57)	China (39)
1 week or less	7.7	1.3	0.9	1.1	1.4	—	—	—
2 weeks or less	12.5	3.2	0.9	5.6	2.8	1.4	—	—
3 weeks or less	19.4	5.3	3.7	13.5	8.2	1.4	5.3	—
4 weeks or less	33.0	9.4	8.3	18.0	10.9	2.8	29.9	—
5 weeks or less	45.7	16.9	20.2	29.2	19.0	7.1	29.9	—
6 weeks or less	56.0	28.8	23.9	33.7	28.5	20.0	33.4	—
7 weeks or less	64.0	37.0	35.8	41.6	47.4	20.0	36.9	—
8 weeks or less	68.1	44.5	51.4	47.2	55.5	21.4	40.4	—
9 weeks or less	71.1	50.1	56.0	55.1	63.6	25.7	43.9	12.5
10 weeks or less	74.1	54.8	58.6	57.7	66.3	32.8	45.7	20.0
13 weeks or less	77.0	67.2	65.2	61.1	67.7	57.1	61.5	27.5

Note: All figures are cumulative percentages. Figures in brackets at the head of each column are the number of cases examined.

It should be said that the figures in table 3 may be regarded as a little flattering to publishers. Books supplied within two weeks or less of our posting an order must be in the stock of the bookseller. This has some small effect on foreign acquisitions. The picture is more complicated for British books, in that some of them are ordered in advance of publication and so obviously cannot be supplied. It is our impression, but no more, that in Edinburgh this would constitute something under 10% of British books. This then is broadly cancelled out by the books actually in stock at the booksellers.

These figures seem to bear out the endless and seemingly weekly letters of complaint in the *Bookseller* about delays in the supply of books. The Booksellers Association survey for 1979 gives depressing proof, if more were needed, that the situation is not only bad, but also continues to deteriorate. Between 1976 and 1979 the time between the despatch of an order by a bookseller to the receipt of the book in his shop increased from fourteen to nineteen calendar days, on average.⁵ Our figures show an even bleaker picture. Even allowing for the inescapable delays between library and bookseller, it is very discouraging to find that only half our British books are supplied within six weeks and, perhaps worse, that only three-quarters arrive within three months. Library users are more than patient in accepting delays in obtaining books from overseas, but find it difficult to understand the delays in books coming from this country. The other results are hardly surprising, except perhaps that it takes as long to obtain books from Germany and France as from the United States. It was certainly to be expected that Italy would be the worst of the major European countries and that Chinese books take longest of all.

Processing

Once the books have arrived, they are accessioned and catalogued. While we found these results reasonably satisfactory, they did indicate where improvements could be made in the present system. There is little point in quoting them in full, as they can have no general validity. The priorities of each library, its backlogs, the form of its catalogues and a variety of local problems and practices mean that the time taken by one library for its processes cannot be of real significance to others. However, as a matter of record, the median book takes one to two weeks to order, seven weeks to arrive, less than one week to accession, one week to be catalogued, one week to be bookplated and prepared for shelving and two more weeks to appear in the catalogue; a total of seven weeks in transit and six weeks undergoing library processes, from the date of recommendation. While each separate process may not be unduly protracted, it cannot be said that the library is at all satisfied that a recommender has to wait three months to see even half his requests appear in the catalogue.

After processing, the books are sent for shelving or for binding. The survey was able to resolve some queries concerning the latter.

Binding policy

Although Edinburgh University Library has an in-house bindery, some items are sent out to commercial binders, particularly paperbacks requiring plastic binding for the undergraduate collection. Our method of keeping statistics on binding is not designed

to let us see how policy decisions on acquisitions are working. Specifically, it is our policy where possible to buy hardbacks for the main (research) collections and paperbacks for the undergraduate collection, or the assumption that in most cases the latter will be worn out or thrown out in five to ten years. Overall then, 24.7% of newly acquired books were received in paperback and were sent for binding. Not surprisingly, this rose to an enormous 61.3% in the undergraduate collection; perhaps one should be surprised that the figure was not higher. More puzzling, the figure for the Main Library research collection was 31.7%, rather higher than the figure for the library as a whole, where it was expected to be lower. These items were therefore looked at in more detail and the explanation seems to lie in the country of origin. While less than one-quarter of British books and less than one-fifth of American books required binding, three-quarters of the more modest European acquisitions arrived paperbound. Outside the Main Library, the other sections of the library acquire British and American material almost exclusively. The Main Library on the other hand is the home of material purchased for the various language departments and so the European languages material is concentrated there, thus giving the higher than expected figure.

Donations were also examined separately from purchases. There was no real difference between the two in the proportions bound. There is no formal policy with regard to the binding of donations, but the great majority of purchases are deliberately acquired in hardback. Therefore, this must either mean that we are offered fewer paperbound books than hardbound or that we unconsciously reject more of those in paperback which we are offered. A subsequent examination of recent donations suggests the latter as a more likely explanation.

Availability of cataloguing records

When considering the automation of cataloguing, one of the main concerns must be that a large enough proportion of the items being catalogued should have commercially available records at the time of cataloguing. If there is too much EMMA (Extra-MARC material), the continuing cost of original cataloguing which this implies, may outweigh the other benefits of automation. The ideal position is therefore to belong to the group with big MARC and little EMMA. When the SCOLCAP surveys were conducted, this was measured by the availability of an ISBN, a Library of Congress number or a BNB number to the existing system of cataloguing. For the three universities involved, the results varied between 38% and 59%. These results were considered good enough for SCOLCAP to be formed and to begin its impressively rapid growth. They therefore provide some kind of yardstick for the level at which the automation of cataloguing becomes worthwhile. The same measure was therefore used in our survey.

TABLE 4 *Availability of control numbers*

61.5% of all records had a control number
69.3% of all post-1960 records had a control number
78.5% of all post-1968 records had a control number
81.8% of all post-1972 records had a control number
84.1% of all post-1975 records had a control number

The overall figure is little better than the best SCOLCAP result. What is more interesting is the considerable improvement seen when the figures are broken down by date as in table 4. This suggests that our figure differs from those found in the SCOLCAP surveys due to the steadily increasing use of control numbers and in particular the ISBN. Of the figures given in table 4, BNB numbers and Library of Congress numbers account for less than 5% of the figure in every case. When it is remembered that table 1 showed a high proportion of our intake as being of recent date, this steadily spreading use and acceptance of the ISBN gives the prospect of an ever growing proportion of our intake with control numbers.

When talking of availability of catalogue records for new stock, one is effectively talking about the availability of MARC records. The presence of a control number does not absolutely guarantee a MARC record, conversely, some items without control numbers at the time of cataloguing will eventually have a MARC record. It was therefore decided to measure how many items would have a MARC record. This was taken to be all 1950 and later British books and all 1968 and later American books. Now, the Library of Congress does, of course, produce MARC records for books from countries other than the United States, but it was thought simpler to use the above definition and then to treat the result as a minimum figure, this having the further advantage of ensuring comparability with the figures from the earlier surveys. Using this measure, we found that 61.3% of books had a MARC record. Two of the three SCOLCAP surveys had results within 1% of this figure, while St Andrews recorded 56.6%.⁶ St Andrews has since examined its 1979 data and found that the hit rate for current intake had risen to 71.7%. As Edinburgh's figure for current intake only was 68.3%, it seems reasonable to suggest that this confirms the expected gradual spread of control numbers, rather than a defect in the original sample.

Currency of BNB entries

It is assumed that any automated system should provide a service no worse than the present manual system, if it is to be acceptable. Books must be received and catalogued at least as quickly as at present. Thus, to reap the full benefits of automation, centrally prepared records must be available to the library when required for a particular process, otherwise, expensive temporary records will have to be prepared. One measure of this is the availability of BNB records.

Table 5 suggests that BNB records are not of enormous value in the ordering of books, although the low figures are no doubt accounted for in part by the number of books ordered before publication. Interestingly, there is little difference between the position at date of receipt and date of completion of cataloguing. This is no doubt simply due to the absence of any significant backlog of current cataloguing in Edinburgh University Library. The figures also show how far BNB has to go in improving its coverage. Although 71.4% of items had BNB records available one day before conventional cataloguing was completed, this still leaves an undesirably high proportion of EMMA cataloguing, when so much of our intake is British material.

The currency and coverage of BNB have long been a topic of debate. At the time of the original SCOLCAP surveys in 1973, the three universities recorded uniformly poor figures of between 25.3% and 28.5% of items with a BNB record one day or more before the book was received. By the time of the St Andrews survey in 1976, this had



TABLE 5. *Availability of ENB records*

BNB entry exists	Date of order	Date of receipt	Date cataloguing completed
More than 10 weeks before	35.1	57.4	60.5
More than 4 weeks before	47.8	66.5	68.6
More than 1 day before	53.6	70.4	71.4
Less than 4 weeks after	57.9	73.5	76.2
Less than 10 weeks after	62.5	79.5	81.7

Note: Figures are cumulative percentages. All 1978 and 1979 UK imprints (789) are included. The figures include Cataloguing in Publication entries.

improved to a much more satisfactory 73.7%. Against this must be set the experience of Newcastle University Library. Their dissatisfaction with both currency and coverage was recorded in a letter to the *Library Association Record*,⁷ which noted that by August 1977 only 85% of their 1976 imprints and only 25% of their 1977 imprints had been recorded in BNB. The British Library freely admitted that BNB was having difficulties in 1977, principally due to a serious loss of staff, but hoped that these difficulties would prove to be of a temporary nature.⁸ It is certainly true that the Edinburgh figure for 1978 returns to the sort of level recorded by St Andrews in 1976. However, our figures include Cataloguing-In-Publication (CIP) records, which should be in BNB much earlier than the full records. As CIP had barely started in 1976 when the St Andrews survey was conducted, this might suggest that BNB still has some way to go to reach even the 1976 level of currency. In any case, even if BNB achieves 75% coverage by the time books are received in a library, this is still woefully short of the standard of service which university libraries and no doubt other libraries require.

Conclusions

Such a large survey demands co-operation and patience from most of the library staff and considerable extra effort from a few charged with organising and analysing the results. Although the aim of the survey was to provide a framework within which questions of automation could be sensibly discussed, it also revealed an uneven level of service, for example in speed of cataloguing, in different branches of the library. A minor reorganization of our existing resources has now allowed us to improve our service where it was shown to be poorest. It is also our hope that this mass of statistical information, of which only a brief summary has been presented here, will allow more informed decisions to be taken on such matters as acquisitions policy and binding policy. Existing policies were shown to be working. For example, the heavy concentration of paperbacks in the undergraduate collection is a direct result of a policy decision. However, we now see much more clearly that while this does save money in acquisitions, it engenders enormous delays while the books are bound, and it may be that some review of our priorities is needed.

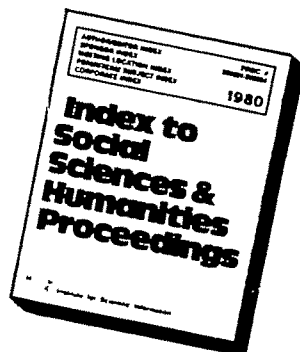
The original reason for the survey was our concern with automation, particularly for cataloguing. It is therefore most encouraging to find the large and growing quantity of MARC material in our acquisitions. Unless we drastically alter our acquisitions policy away from such material, this offers real prospects of savings in cataloguing through the use of centrally prepared records. But it is disturbing to find that a library with no backlog of current cataloguing appears to be very poorly served by the currency of these records. There seems little point in incurring enormous expense to slow down our cataloguing, although even the delay thus caused pales beside the dismal performance of the British book trade in the speed with which it supplies its books

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